Yucaipa Valley Water District
2005 Draft Urban Water Management Plan

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DRAFT
Yucaipa Valley Water District
2005 Urban Water Management Plan and Water Shortage Contingency Plan

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Yucaipa Valley Water District
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Section 1. Introduction

1.0 Introduction

This 2005 Urban Water Management Plan (Plan or UWMP) has been prepared for the Yucaipa Valley Water District (District) in conformance with the California Urban Water Management Planning Act, California Code Division 6, Part 2.6, Urban Water Management Planning (Act). This Plan is a revision and update of the District's 2000 Urban Water Management Plan (excerpted sections of the Act are in italics at the start of each section of this Plan).

This 2005 Plan describes and evaluates the District's water supply sources, the efficient uses of that water supply, demand management measures with an implementation strategy and schedule, and other relevant information and programs. Specific information required by the Act is cited in the Plan in italic font at the start of each relevant section. Following the provisions, the text of the Plan responding to those requirements is provided.

Section 1 of the Plan presents the public participation involved in preparing the Plan, an overview of the supplier service characteristics, and a description of current and future water use. Section 2 provides information on water sources and reliability, Section 3 presents a description and evaluation of Demand Management Measures (DMMs), Section 4 includes the Water Shortage Contingency Plan, and Section 5 provides references cited in the document. Following these sections, appendices are provided to further support the information presented in the Plan.

1.1 Public Participation

> *10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the*

Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

As stated above, this Plan is a revision and update of the 2000 Plan. Since it was an update of the District's 1990 Urban Water Management Plan, the 2000 Plan included a substantial amount of new information relating to the District's water supply sources, water use, and programs. The YVWD Board of Directors held a public workshop on the Plan on November 16, 2000, and a public hearing on December 20, 2000 to review the 2000 Plan with local agencies and to announce availability to the general public. In addition, individual meetings were held with major property developers and various local agencies, and notifications of the 2000 Plan development were made directly to the organizations listed below.

Public Agencies and Government:

- City of Yucaipa
- City of Calimesa
- San Bernardino Valley Municipal Water District
- San Gorgonio Pass Water Agency
- California Regional Water Quality Control Board, Santa Ana Region
- County of San Bernardino
- County of Riverside
- City of Beaumont Wastewater Authority
- Beaumont Cherry Valley Water District
- City of Redlands
- Yucaipa-Calimesa Joint Unified School District
- Riverside Local Agency Formation Commission (LAFCO)
- San Bernardino LAFCO
- East Valley Resource Conservation District (RCD)

Private Water Purveyors:

- Western Heights Water Company
- South Mesa Water Company

Environmental/Interest Groups:

- San Timoteo Greenway Conservancy
- Oak Glen Community Services Organization

Media:

- Yucaipa and Calimesa News Mirror
- Press Enterprise
- The San Bernardino Sun

This 2005 Plan is an update of the 2000 Plan, with additional information relative to continued development of supply sources and water management actions, extending demand projections beyond the required 20 years to 25 years in order to accommodate potential requirements for provision of water supply assessments (Water Code § 10190-10915) and Written Verifications of Supply (Government Code § 66473.7.) during the 2006-2010 period.

Notices have been provided to the following land use jurisdictions in which the District serves water regarding the availability of the Plan: the City of Yucaipa, the City of Calimesa, the County of San Bernardino, and the County of Riverside. The Plan was also made availability to these jurisdictions. Notice for the public hearing was made on _____, 2006 and a public hearing on the Plan was held by the District Board on May _____, 2006

1.2 Supplier Service Area Characteristics

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

a. Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

Introduction

The District provides water, wastewater, and recycled water services to customers in the Cities of Calimesa and Yucaipa, and portions of Riverside and San Bernardino Counties (**Figure 1-1**). The District was formed in 1971, acquiring many of the private water companies serving the Yucaipa Valley. The District has continued to consolidate water services in the region, acquiring the Harry V. Slack Water Company in 1987 and the Wildwood Canyon Mutual Water Company in 1992.

Water was originally developed in the region to serve a predominantly agricultural base of orchard crops. Increasingly over the past ten years, agriculture has given way to urban and suburban development and water demands are growing apace with population increases. In order to determine the rate and amount of growth in the community, the District relies on the development approval processes of the City of Yucaipa, the City of Calimesa, the County of San Bernardino, and the County of Riverside. The District utilizes the planning projections of these agencies, together with the demands of the current residents and businesses, to predict the needs for a safe and reliable water supply.

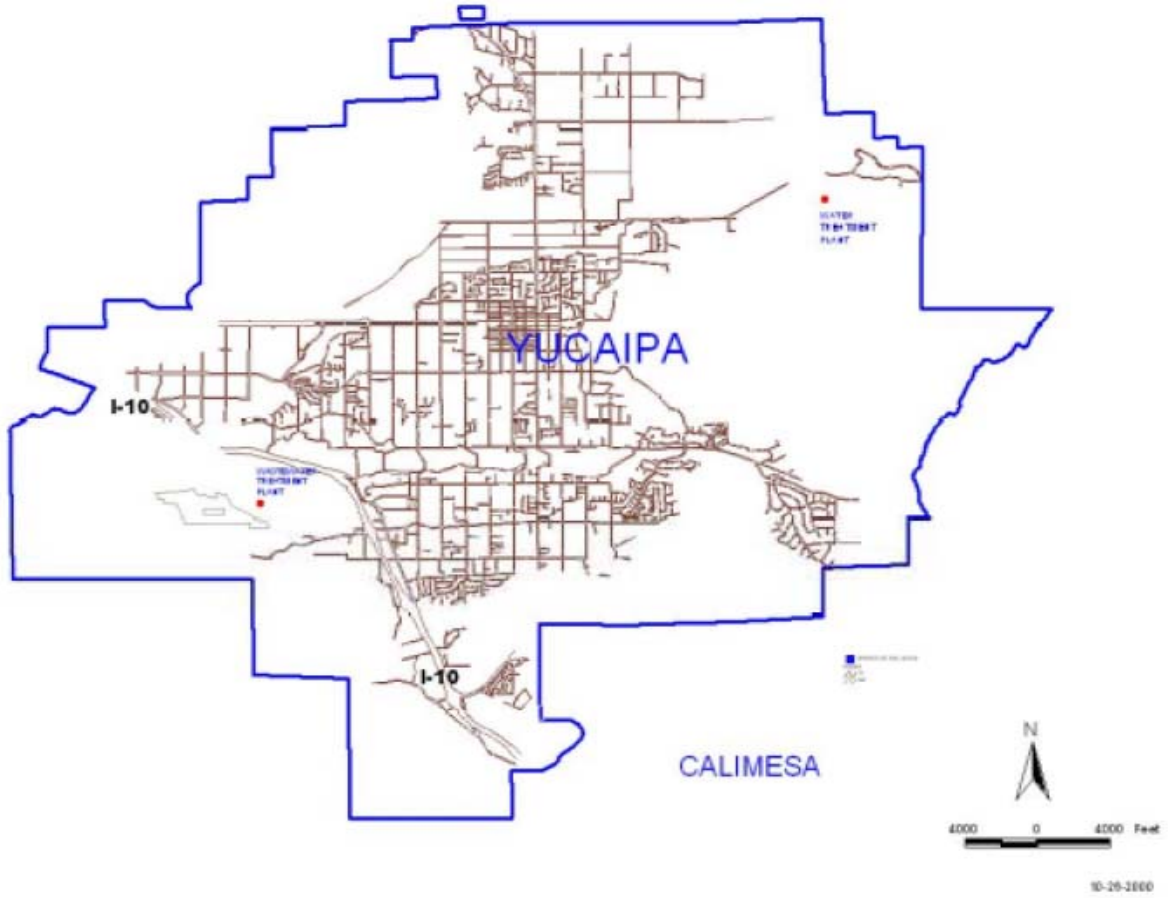
Physical Setting and Climate

The Yucaipa Valley is bounded by the San Bernardino National Forest to the north and east, low-lying hills to the south, and the Crafton Hills to the northwest. The District serves elevations ranging from 1,600 feet above sea level to about 4,300 feet above sea level. The City of Yucaipa lies in the middle of this range at about 1,640 feet.

The climate of the region is a Mediterranean type with dry, warm summers and cool, wet winters that have significant precipitation variation year to year. **Table 1-1** summarizes the average climate data for the area.[1]

[1] Average temperature and precipitation information for Redlands, CA is from the National Oceanic and Atmospheric Administration (NOAA) website http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?caredl. The period of record is from 12/1/1927 to 3/31/2005. Average evapotranspiration from a standardized grass surface (reference evapotranspiration or ET_0) was found on the California Irrigation Management System (CIMIS) website, http://www.cimis.water.ca.gov/cimis/frontStationDetailInfo.do?stationId=44&src=info. The nearest CIMIS station is at the University of California, Riverside, Station #44, which has been operating since June 1985.

Figure 1-1. Yucaipa Valley Water District



Average temperature information is provided for Redlands, California, which is near Yucaipa but at a slightly lower elevation of 1, 571 feet. Daytime temperatures in the upper portions of the Yucaipa Valley served by the District will average 2-7 degrees cooler than Redlands due to elevation differences. Climate in these upper reaches of the District will more closely mimic that of the Beaumont weather station data (Beaumont 1E, California, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?cabeau+sca) at about 2,600 feet in elevation. Precipitation is also greater as elevations rise towards the mountains above the Yucaipa Valley due to the effect of orographic lift – the lifting of air caused by its passage up and over the mountains that causes the air to cool

and humidity to increase. Occasionally snow can fall in the Yucaipa area as mid-winter cold fronts pass, though rapid melting usually follows.

In addition, average evapotranspiration for a standardized grass surface (also called reference evapotranspiration or ET_0) is provided for the University of California, Riverside (UC Riverside), the closest station providing ET_0 data for the area.

Table 1-1. Climate Data for Yucaipa Valley Water District Service Area

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Avg. ET_0 (inches)[a]	2.49	2.91	4.16	5.27	5.94	6.56	7.22	6.92	5.35	4.05	2.94	2.56	56.37
Avg. Total Precipitation (inches)[b]	2.55	2.73	2.22	1.13	0.41	.010	0.07	0.18	0.34	0.66	1.15	1.94	13.46
Avg. Max. Temperature (degrees F)[b]	64.9	66.2	69.1	74.1	79.0	86.4	94.5	94.4	90.1	81.2	72.4	66.1	78.2
Avg. Min. Temperature (degrees F)[b]	39.5	41.4	43.7	47.0	51.6	55.6	60.7	61.2	58.2	51.6	43.8	39.7	49.5

[a] Average evapotranspiration from a standardized grass surface (reference evapotranspiration or ET_0) was found on the California Irrigation Management System (CIMIS) website, http://www.cimis.water.ca.gov/cimis/frontStationDetailInfo.do?stationId=44&src=info. The nearest CIMIS station is at the University of California, Riverside, Station #44, which has been operating since June 1985.
[b] Average temperature and precipitation information for Redlands, CA is from the National Oceanic and Atmospheric Administration (NOAA) website http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?caredl. The period of record is from 12/1/1927 to 3/31/2005.

As shown in **Table 1-1**, the average annual temperature for Redlands, California is 78.2 degrees Fahrenheit (F) maximum and 49.6 degrees minimum. The average July maximum is 94.5 degrees, and the average minimum is 60.7 degrees. The average January maximum is 64.9 degrees, and the average minimum is 39.5 degrees. Average total precipitation is 13.46 inches, with 87 percent of precipitation occurring November through April. Also, the average annual ET_0 for UC Riverside is 56.37 inches, and the average ET_0 for July is 7.22 inches.

Projected Population Estimates

To estimate the future rate and amount of growth in the area, the District relies on the projections developed by the Cities of Yucaipa and Calimesa, along with information obtained from individual developers. Currently, the City of Calimesa has 7,273 residents, and the City of Yucaipa has approximately 49,388 residents (City of Calimesa website and City of Yucaipa website).

The larger master planned community of Oak Valley is proposed for development to the south of Calimesa. The total build-out population for Oak Valley is estimated at 37,500 residents. Based on land use plans provided by the developer, only an estimated 61 percent of the development lies within the District's sphere of influence. This results in an estimated build-out population for the District of about 22,900 residents within the YVWD served portion of Oak Valley.

The Cities of Yucaipa and Calimesa provided population projections for the years 2020, 2030, 2040, and 2050. It is assumed that these projections include the portions of the unincorporated County areas that lie in the District's sphere of influence. Projections for the Oak Valley area were provided by the developer and indicated that they anticipate their first occupancies will occur in 2005, with a 20-year build-out schedule to the ultimate population. These population projections are summarized in **Table 1-2**. As shown in the table, the total population for the District is projected to reach 81,900 residents by 2020, and 94,800 residents by 2030.

Table 1-2. Current and Projected Population for Yucaipa Valley Water District

	2005	2010	2015	2020	2025	2030	2040	2050
City of Yucaipa	49,388	49,689	53,337[a]	56,984	59,942[a]	62,900	67,400	69,700
City of Calimesa	7,273	9,000	9,000[a]	9,000	9,000[a]	9,000	9,000	9,000
Oak Valley Development[b]	500	5,600	10,700[a]	15,800	19,350[a]	22,900	22,900	22,900
Total Service Area Population	**56,661**	**64,289**	**73,037**	**81,784**	**88,290**	**94,800**	**99,300**	**101,600**

[a]Straight-line estimate used since population projection not provided for the listed year.
[b]Includes 61 percent of Oak Valley development that is to be within YVWD Service Area

1.2.1. Current and Future Water Use.

10631. (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

Current Water Demand

In 2004, the District's average daily demand was 10.36 million gallons per day (mgd), with a winter average daily demand of 5.28 mgd, and a summer average daily demand of 16.16 mgd. For that year, average water demand within the District was about 11,614 acre-feet per year (AF/Y).[2]

Figure 1-2 shows average daily water demand for potable and non-potable (raw, untreated water and recycled water) water from July 2002 to July 2005. During that time period, the maximum daily demand was 16.35 mgd for potable water (July 2002) and 2.46 mgd for non-potable water (September 2004). The rolling twelve-month average daily demand is about 10 mgd for the potable water system and 1 mgd for the non-potable water system. For a yearly average, this translates to 11,210 AF/Y for the potable water system, and 1,121 AF/Y for the non-potable water system.

[2] 1 mgd is equal to 1,121 acre-feet per year.

Figure 1-2. Average Daily Water Demand for Yucaipa Valley Water District

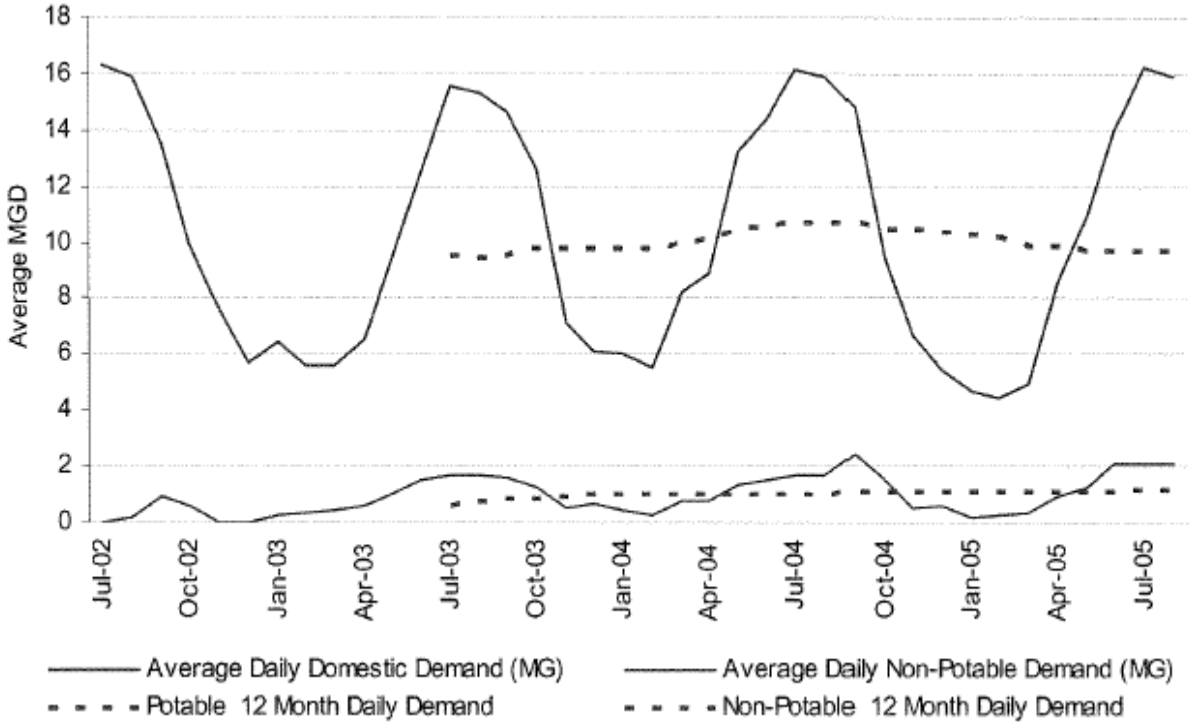


Figure 1-3 shows the potable and non-potable water consumption from January 2000 to July 2005. The District staff has been working diligently to expand the non-potable water distribution throughout the Yucaipa Valley. In July 2005, District customers used about 500 million gallons of potable water and about 60 million gallons of non-potable water.

A disaggregated tabulation of the number of accounts and water use was conducted using data from the District's Public Water Systems Statistics Report to the State Department of Water Resources in 2004. Single family is the largest water use sector, with 9,752 accounts or 92 percent of total customer accounts. **Figure 1-4** illustrates the annual water use by sector

Figure 1-3. Potable and Non-potable Water Demand for Yucaipa Valley Water District

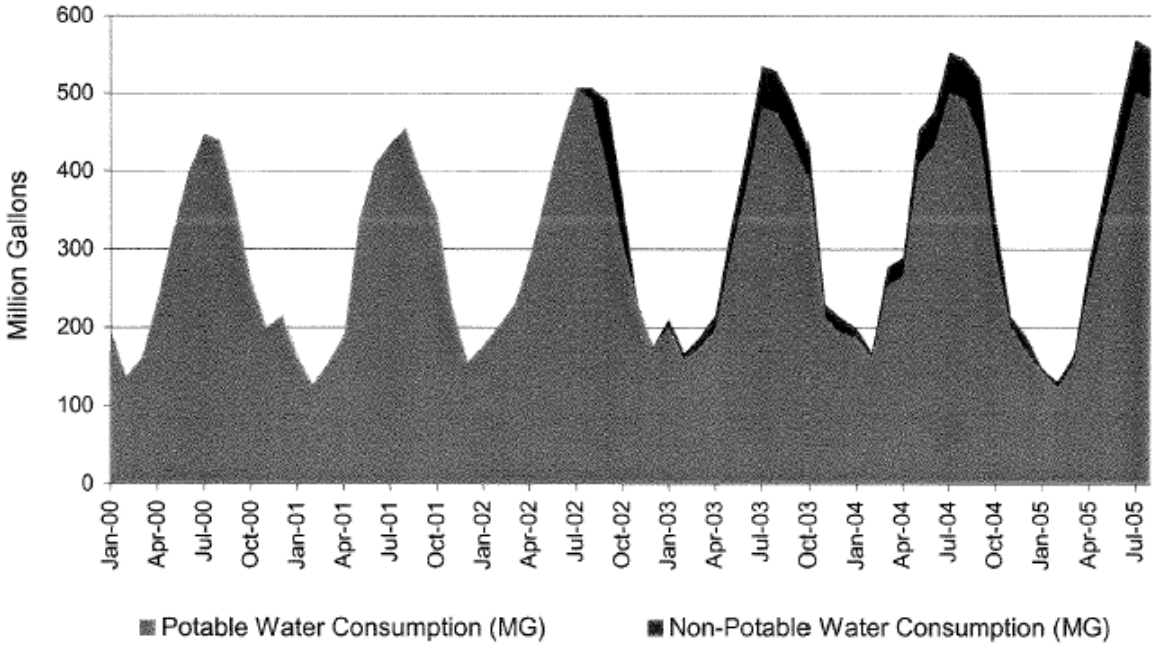


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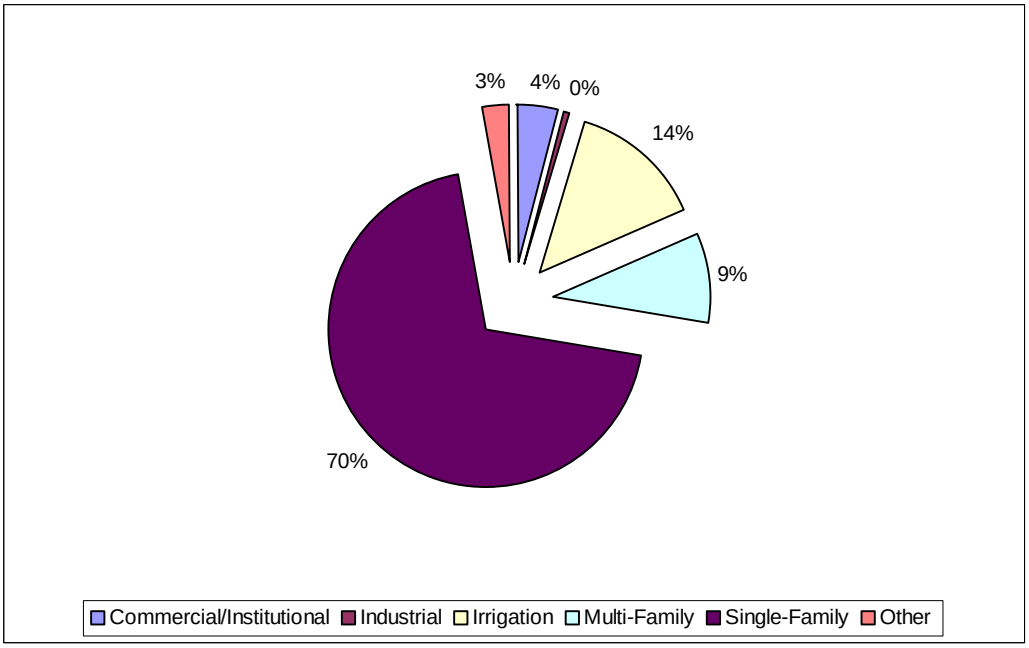
Figure 1-4. Annual Water Use by Sector for Yucaipa Valley Water District

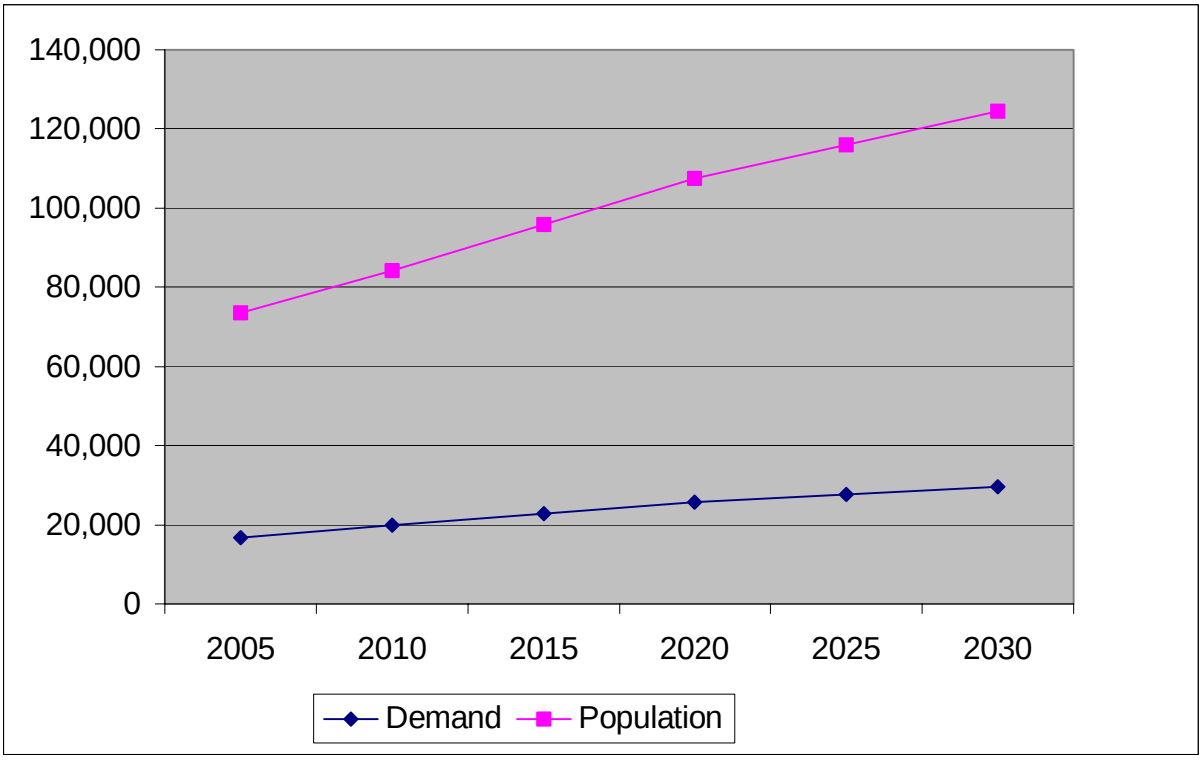


Future Water Demand

Based upon projected population growth estimates from the State Department of Finance, the Planning Departments of the Cities of Yucaipa and Calimesa, in addition to data from the Oak Valley Environmental Impact Report, the District's population is expected to grow to about 81,900 residents in 2020. Based upon an average per capita demand of 280 gallons per day, total demands in 2020 are expected to grow to about 25,700 AF/Y.

Figure 1-5 shows projected water demand from 2005 to 2030 (Yucaipa Valley Water District Water Master Plan, February 2004). Future projections are based on per capita consumption for recent years and population projections included in **Table1-2**. Growth projections are driven to a large extent on the expected build-out within local communities.

Figure 1-5. Projected Annual Water Demand for Yucaipa Valley Water District



Population is expected to grow rapidly over the next 25 years. New developments will be completed with irrigated landscapes and golf courses, requiring considerable demand for water

resources. These changes represent not only an increase in population, but also an increase in water-consuming activities such as landscaping and golf courses.

The total Year 2000 Census population of approximately 48,500 residents, and an estimate of 23,000 Equivalent Dwelling Units (EDU) within the District's Sphere of Influence, results in a calculation of about 2.1 persons per EDU. This EDU value is lower than typically expected, probably due to a higher percentage of retirement-type housing, but is anticipated to increase to about 2.5 persons per EDU in the future as the area shifts toward more typical family-oriented housing. Based on the total area population and water use, the per-capita water consumption is estimated to be roughly 280 gallons per capita per day (Yucaipa Valley Water District Water Master Plan, February 2004).

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Section 2. Water Sources and Reliability

2.1 Groundwater

10631. (b) ….If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

The Yucaipa Valley Water District has traditionally met the bulk of service area customer needs from groundwater. The District currently has 34 active and standby groundwater wells available for use. Due to the age and poor condition of some of these well facilities, only 20 of the active wells are anticipated to remain in service through 2010. Most of these wells pump from the Yucaipa Groundwater Basin, with less than 1,000 acre-feet being pumped from the Beaumont Basin. Demand has grown in the last two decades to where the District alone is now pumping over 11, 000 AF/Y. When combined with pumping by the Western Heights Municipal Water Company and South Mesa Water Company of about 2,400 acre-feet per year for each company,

the basin is technically in an overdraft situation based on some estimates of basin yield. However, groundwater elevations overall have been relatively stable with elevation recovery in the older portions of the District balanced against declines in groundwater elevations in outer reaches of the District, as shown in **Figure 2-1**.

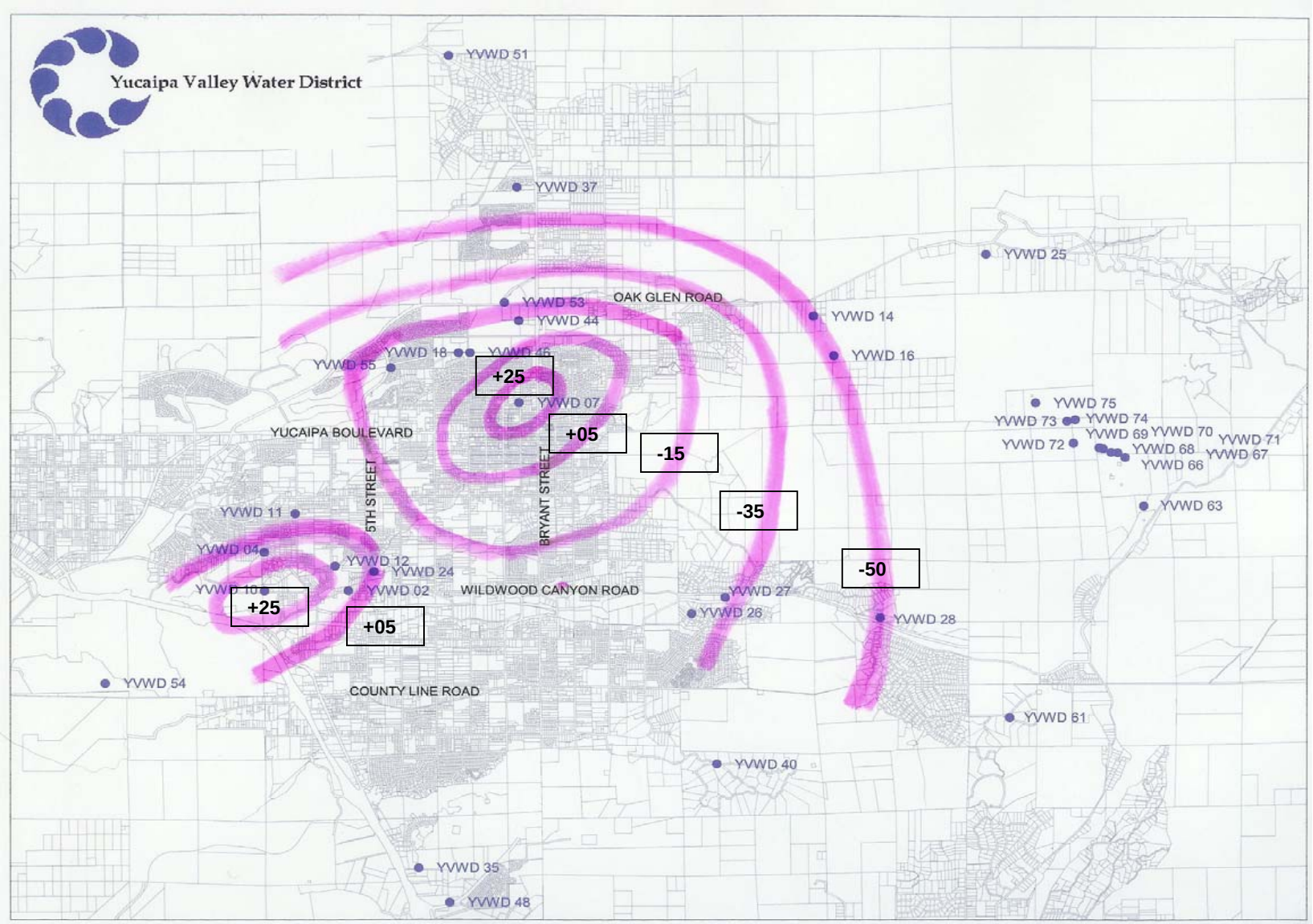
The Yucaipa Groundwater Basin is located in the Santa Ana Subregion of the South Coast Hydrologic Region. The California Department of Water Resources Bulletin 118-2003 does not identify the Basin as overdrafted or project a future overdraft situation. The Yucaipa Groundwater Basin is subdivided into seven subbasins as follows:

- Mill Creek
- Gateway
- Crafton
- Oak Glen
- Calimesa
- Wilson Creek
- San Timoteo

The Wilson Creek and Calimesa subbasins are the largest and most important of these subbasins. Total capacity of the basin is estimated at 807,517 acre-feet (Fox, 1990). Groundwater is typically reached within 200-289 feet below the land surface. If pumping were to reduce groundwater levels to an average depth of 400 feet, an additional 300,000 acre-feet of water would be available. These subbasins historically have declined during dry cycles and risen during wet ones. No subsidence due to water pumping has been noted. Minor amounts of groundwater recharge (less than 1,000 acre-feet/year) through surface water spreading have occurred in the Wilson Creek spreading grounds, an area of four spreading basins located within the District along Wilson Creek.

In February 2004 the San Timoteo Watershed Management Authority filed a judgment adjudicating the groundwater rights in the Beaumont Basin and assigned the Beaumont Basin Watermaster with the authority to manage the groundwater basin (**Attachment B**).

Figure 2-1. YVWD Well Locations & Groundwater Elevation Changes, 1979-2000 in Feet



The Beaumont Basin Watermaster is comprised of managers from the Beaumont Cherry Valley Water District, City of Banning, City of Beaumont, South Mesa Mutual Water Company and Yucaipa Valley Water District.

The adjudication of the Beaumont Basin has defined overlying and appropriator pumping rights and also allows for supplemental water to be stored and recovered from the basin. The Beaumont Basin, under this adjudication, is considered to be in a condition of overdraft with assigned maximum annual overlying production rights of 8,650 acre-feet. Yucaipa Valley Water District has a right to an operating yield of 2,552 acre-feet annually from the Beaumont Basin, which consists of 381 acre-feet of appropriative right and 2,173 acre-feet of Controlled Overdraft and Supplemental Water Recharge Allocation. The District can deliver amounts in addition to the 2,552 acre-feet as supported from overlying water right holders.

In the Yucaipa groundwater basin, significant potential exists to increase spreading of water in the Wilson Creek spreading grounds and utilization of the Oak Glen Creek stream channel for additional recharge. By maximizing the existing spreading grounds and expanding spreading acreage along Oak Glen Creek (25-50 acres), the capability exists to spread from 7,000 to 14,000 acre-feet of surface water annually into the Yucaipa Basin. **Table 2-1** below shows the amount of water pumped from District wells for the past five years.

For the next five years and beyond, the District could meet 100 percent of the full demands with groundwater and recycled water. By the year 2010 the firm groundwater pumping capacity is anticipated to be approximately 13,800 AF/Y. However, since treated supplemental surface water is expected to come on-line in 2007 as further discussed below, actual groundwater demands would be reduced to less than half of available capacity in 2010 and remain well below the estimated safe yield through 2050. In dry years with limited surface water supplies, pumping could be temporarily increased, accessing water stored in the basin in prior years due to reduced pumping.

Table 2-1. Yucaipa Valley Water District Well Production in Acre-Feet 2000-2004

	2000	2001	2002	2003	2004
Well 2	1370.75	1013.78	1018.82	1039.28	1029.05
Well 4	486.62	419.56	457.35	546.81	395.08
Well 7	300.56	238.25	234.21	207.28	155.27
Well 10	329.63	356.12	447.70	124.89	426.83
Well 11	191.79	130.81	226.60	204.41	122.20
Well 12	793.35	875.92	1186.71	1032.17	659.53
Well 14	45.64	21.58	13.05	5.05	3.19
Well 16	28.91	30.31	53.92	46.09	35.11
Well 18	782.05	780.99	559.81	521.84	266.26
Well 24	560.84	675.50	606.84	669.81	1018.68
Well 25	415.12	385.02	284.57	350.11	271.84
Well 26	103.49	92.74	77.14	85.85	66.00
Well 27	273.94	124.68	145.83	155.42	114.60
Well 28	46.34	44.5	30.02	29.49	28.74
Well 34	--	--	--	--	--
Well 35	355.87	312.74	38.98	74.53	226.48
Well 37	274.64	192.56	165.86	158.43	126.86
Well 39	--	--	--	--	--
Well 40	0.07	21.92	12.24	9.18	13.31
Well 44	345.87	314.48	359.55	295.12	122.40
Well 46	1632.87	1919.32	1845.79	1572.78	1939.88
Well 48	417.52	1061.26	1564.79	1662.93	1607.35
Well 51	--	--	173.81	285.85	300.81
Well 53	1164.01	1102.09	1229.20	1073.81	1126.36
Well 54	2.76	4.69	3.97	7.41	4.81
Well 55	--	--	722.05	589.14	830.80
Well 56	--	--	--	1.33	531.47
Well 57	--	--	--	--	--
Well 60	--	--	--	--	--
Well 61	45.51	53.47	32.98	22.03	28.67
Well 62	--	--	--	--	--
Well 63	0.26	--	--	--	--
Well 64	--	--	--	--	--
Well 65	--	--	--	--	--
Well 66 (horizontal)	1.22	--	--	--	--
Well 67 (horizontal)	51.60	50.03	45.09	--	--
Well 68, 69, 70, 71	18.82	9.67	5.38	13.37	11.96
Well 72	14.80	16.73	17.90	17.98	15.86
Well 73	10.65	15.10	24.05	20.87	20.89
Well 74	--	--	--	--	--
Well 75	33.02	40.04	20.27	34.76	16.55
Well 76	--	--	--	--	--
Oak Glen Greek	102.04	36.77	74.48	56.14	39.58
Birch Creek	131.43	75.22	88.80	86.02	47.61
Total AF	10331.79	10415.85	11767.76	11000.21	11604.03
Total MG	3366.41	3393.80	3834.29	3584.20	3780.94

Source: District records.

For planning purposes it is assumed that 15 percent of the firm well capacity could be unavailable during a maximum day condition, which reduces the District's available groundwater production capacity to about 12,000 gpm. **Table 2-2** and **Figure 2-2** illustrate planned groundwater use and maximum demand vs. pumping capacity.

Table 2-2

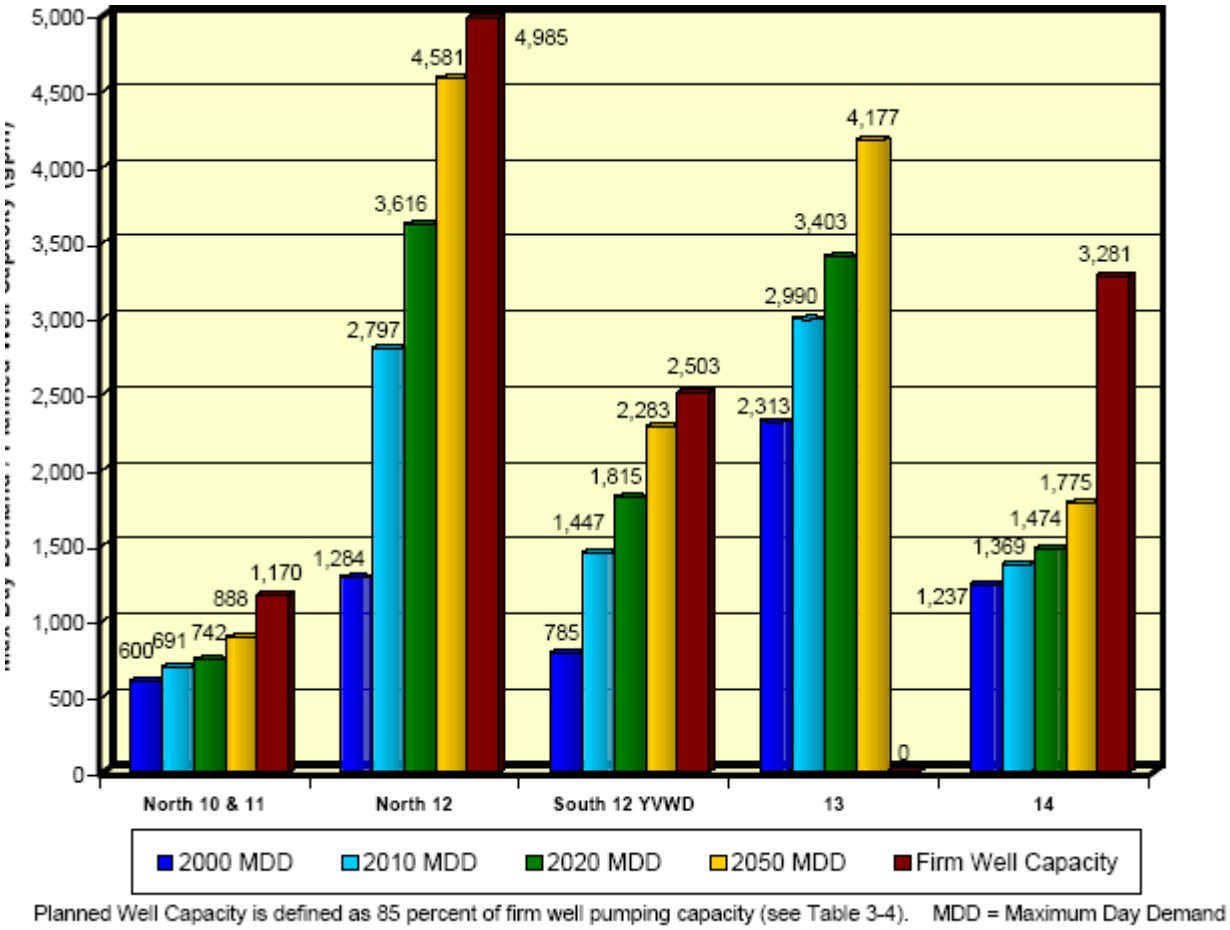
Planned Groundwater Use

	2010		2020		2050	
	gpm	afy	gpm	afy	gpm	afy
Average Day Demand						
Zone North 10	128	206	194	313	256	413
Zone North 11	347	559	372	600	445	718
Zone North 12	1,402	2,262	1,813	2,924	2,296	3,704
Zone South 12 YVWD	725	1,170	910	1,467	1,144	1,846
Zone 14	686	1,107	739	1,192	890	1,435
Total Average Day Demand	**3,288**	**5,304**	**4,027**	**6,496**	**5,031**	**8,116**
Estimated Basin Safe Yield		10,000		10,000		10,000
Use Under Safe Yield, afy		**4,696**		**3,504**		**1,884**
	gpm	**mgd**	**gpm**	**mgd**	**gpm**	**mgd**
Total Well Water Demand	**3,288**	**4.7**	**4,027**	**5.8**	**5,031**	**7.2**
Well Pumping Capacity [1]						
Total Capacity	14,657	21.1	14,657	21.1	14,657	21.1
Firm Capacity	13,752	19.8	13,752	19.8	13,752	19.8
Planned Capacity	11,689	16.8	11,689	16.8	11,689	16.8
Well Capacity less Ave Day Demand	**8,401**	**12.1**	**7,662**	**11.0**	**6,658**	**9.6**

[1] Firm Capacity is pumping capacity with largest pump out of service.
Planned Capacity is firm capacity reduced by 15 percent to account for maintenance operations.

Source: YVWD Water Master Plan

Figure 2-2. Maximum Daily Demand vs. Well Capacity by Zone



Planned Well Capacity is defined as 85 percent of firm well pumping capacity (see Table 3-4). MDD = Maximum Day Demand

Source: Water Master Plan

The District is currently involved with development of a groundwater management plan (AB 3030 Plan) to prescribe collective management of the Yucaipa basin. With ample storage, ability to recharge the basin through in-lieu use of surface water and by direct spreading surface waters and apparent flexibility in managing groundwater levels without subsidence problems, the Yucaipa Basin could be conjunctively managed both to meet normal annual demands and to meet water resource needs in the event of a drought and curtailment or loss of inconsistent surface water supplies, resulting in a highly reliable water supply. Current goals are to secure

agreements to not pump beyond the long-term safe yield of the basin, supplementing supplies with imported surface water or groundwater.

The District is also able to receive water from the San Bernardino Basin via the East Branch extension of the State Water Project (SWP) pipeline. This water would be served as part of the conjunctive management scheme for the basin coordinated with the San Bernardino Valley Municipal Water District, the regional wholesaler of SWP water in San Bernardino County. In addition to SWP water a portion of the San Bernardino Basin known as the Bunker Hill Pressure Zone, has encountered problems from high groundwater tables occurring mainly after a series of wet years. This high groundwater creates direct impacts in portions of the pressure zone, flooding basements and underground garages, and creates a high liquefaction potential for areas overlying the zone in the event of an earthquake. Conjunctive management of this zone along with other portions of the basin, can lower unacceptably high groundwater and allow for recharge in areas up gradient from the Pressure Zone, such as the Lytle Creek subbasin. Thus water from this basin could be transported to the Yucaipa Valley and treated in Yucaipa's surface water treatment plant, as another supplemental water source in addition to SWP water.

Table 2-3 provides a detailed description of the Yucaipa's groundwater pumping capacity. Well locations can be found on **Figure 2-1**.

In October of 2000, the District entered into a Memorandum of Understanding with the California Department of Water Resources, the San Gorgonio Pass Water Agency, the City of Beaumont, the City of Banning, The Beaumont-Cherry Valley Water District and the South Mesa Water Company to work cooperatively on formulating a conjunctive water management program to enhance the dependable yield of the San Gorgonio Pass Area Basins.

Table 2-3. Existing Well Facilities and Pumping Capacity

Well	Status	Basin	Current Firm Capacity[a]	2010 Firm Capacity[a]
2	Active	Yucaipa	1,010	1,091
4	Active	Yucaipa	513	--
7	Active	Yucaipa	424	--
11	Active	Yucaipa	622	622
12	Active	Yucaipa	969	969
14	Active	Yucaipa	0	--
16	Active	Yucaipa	400	--
18	Active	Yucaipa	941	--
24	Active	Yucaipa	860	860
25	Act./surface source	Yucaipa	250	250
26	Active	Wildwood Cyn	--	--
27	Active	Wildwood Cyn	270	--
28	Active	Wildwood Cyn	--	--
35	Active	Wildwood Cyn	695	695
37	Active	Yucaipa	216	--
39	Standby	Yucaipa	--	--
40	Standby	Yucaipa	--	--
44	Active	Yucaipa	660	660
46	Active	Yucaipa	1850	1850
48	Active	Beaumont	2250	2250
51	Under Repair	Yucaipa	375	--
53	Active	Yucaipa	1350	1350
55	New	Yucaipa	N/A	1200
56	New	Yucaipa	N/A	1200
60	Standby	Wildwood Cyn	--	--
61	Active	Wildwood Cyn	--	--
62	Standby	N/A	--	--
63	Standby	N/A	--	--
64	Standby	N/A	--	--
72	Active	N/A	--	--
73	Active	N/A	--	--
74	Active	N/A	--	--
75	Active	N/A	125	--
Total Existing Production Capacity (gpm)			14,616.0	13,752.0
Total Existing Production Capacity (mgd)			21.0	19.8
Available production during Max Day, assumed at 85% of total			17.9	16.8

[a]GPM
Source: YVWD Water Master Plan.

2.2 Surface Supplies

While surface water supplies currently and prospectively available to the District are all considered inconsistent in that the available amounts vary year to year based upon hydrology and other demands on these resources, several surface water supply sources will become available to the District for potable purposes with completion of the Yucaipa Valley Regional Water Filtration Facility (Regional WFF) in 2007. These surface water supplies include the Mill Creek, Santa Ana River and the State Water Project. These new surface water supplies and the local surface water that is currently being used are discussed briefly in the following sections.

2.2.1 Local Surface Water Supplies

The District has traditionally received about 1,000 acre-feet of surface water supplies from the Wildwood Canyon and Oak Glen watersheds. Production from these sources has recently been declining to less than 500 acre-feet annually. These sources are both minor and relatively unreliable due to their greater availability only in wet periods.

2.2.2 Mill Creek Supplies

Through the Santa Ana-Mill Creek Cooperative Water Project Agreement, the District is able to exchange up to 32 cfs (cubic feet per second) of State Water Project water for Mill Creek water when available. This water can be delivered by gravity to the Wilson Creek spreading ground and, when the District's water treatment plant is built, this water can serve direct delivery needs. The SWP exchange water is delivered to the City of Redlands' Hinckley or Tate water treatment plants. This source is highly variable, depending upon local hydrology. Flows in the creek can range from 10,000 to 120,000 acre-feet per year with the bulk of high water flows in the winter months. This is the least expensive supplemental surface water supply for the District. However, lack of storage limits the ability to exchange this water often available in wet years for water during dry years.

2.2.3 Santa Ana River Supplies

In addition to the Mill Creek supplies, the District will be able to receive exchange water from Santa Ana River water right holders once the Regional Water Filtration Facility is completed and connected to Phase I of the State Water Project East Branch extension pipeline, anticipated to occur in 2007.

Phase II of the extension project will expand transmission capacity to the Yucaipa area to 88 cubic feet per second (cfs) (equivalent to 56.9 million gallons per day [mgd]), with 48 cfs (31.0 mgd) of capacity rights held by San Gorgonio Pass Water Agency and 40 cfs (25.9 mgd) by the San Bernardino Valley Municipal Water District. Santa Ana River water availability to Yucaipa would be subject to availability and exchange of SWP water.

2.2.4 Seven Oaks Dam Supplies

The recently completed Seven Oaks Dam operated by the U.S. Army Corps of Engineers is expected to eventually provide a minimum of 10,000 AF/Y of water per year. The San Bernardino Municipal Valley Water District and Western Municipal Water District have filed for a water right of up to 200,000 AF/Y. The two districts and a number of other water users have reached an agreement that calls for use of the water in a conjunctive management program to maintain groundwater levels at a number of specified monitoring locations. In surplus conditions, some of this water may be directly available to YVWD. When the East Branch extension pipeline and water filtration plant is in service in 2007, Seven Oaks water could be delivered to Yucaipa for direct delivery to consumers. However, there currently are significant water quality issues with any excess impounded waters behind the dam. Due to conditions in the watershed, excess turbidity is occurring in the runoff, rendering it unfit for consumption without treatment beyond the scope of that used for other surface supplies. Resolution of this water quality problem does not appear imminent and thus the District cannot consider this to be an available source within the time frame of this UWMP.

2.2.5 State Water Project Water

The San Bernardino Valley Municipal Water District encompasses much of the District and holds an entitlement to SWP water in the amount of 102,600 acre-feet annually. The San Gorgonio Pass Water Agency serves the remainder of the District through its SWP entitlement of 17,300 acre-feet per year. With the completion of the East Branch Extension Pipeline, SWP water is available directly or by exchange. This water can only be used for groundwater recharge or non-potable use until the Yucaipa Valley Regional Water Filtration Facility is completed in 2007.

SWP reliability has been negatively affected due to the State's inability to complete the project as contracted. Despite efforts, it is likely that the full 4.2 million acre-feet design delivery capacity will never be reached due to environmental limitations. Currently the maximum delivery capability for the project is somewhat less than 3.5 million acre-feet. In most years this amount cannot be delivered due to infrastructure limitations and environmental restrictions.

California Department of Water Resources conducts modeling studies to evaluate the reliability of SWP water deliveries, assuming an export limit of 6,680 cfs, Delta water quality standards per the 1995 Delta Water Quality Control Plan, and operation coordinated with the federal Central Valley Project per the 1986 Coordinated Operations Agreement. Below, **Figure 2-3**, from the Draft State Water Project Reliability Report, 2005, depicts the probability of Table A (basic contracted amounts) of SWP deliveries in 2005. **Figure 2-4** models probable deliveries for 2025.

Figure 2-3. Delta Table A Delivery Probability for Year 2005

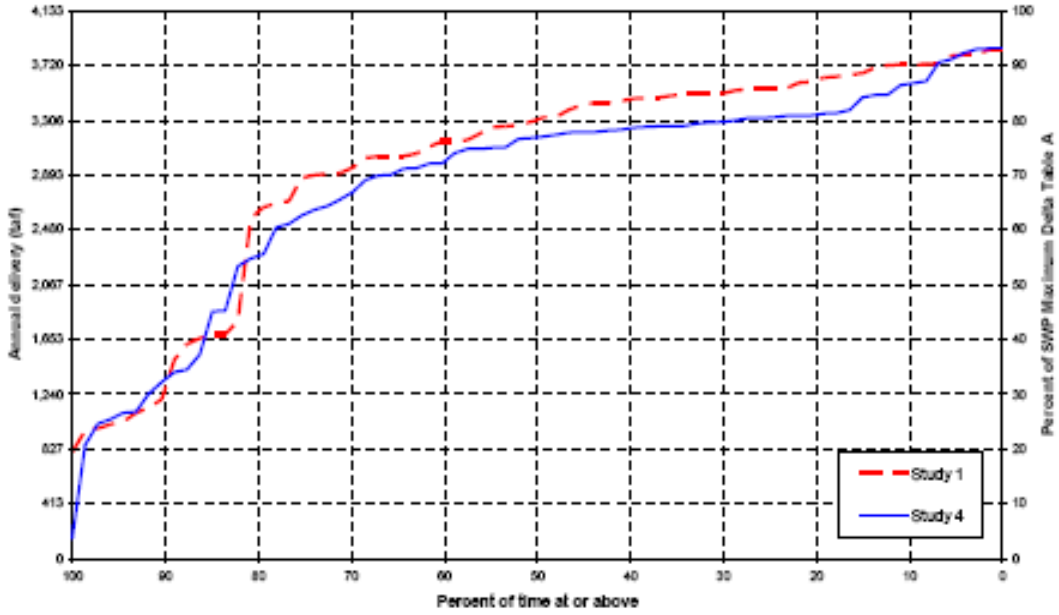


Figure 2-4. Delta Table A Delivery Probability for Year 2025

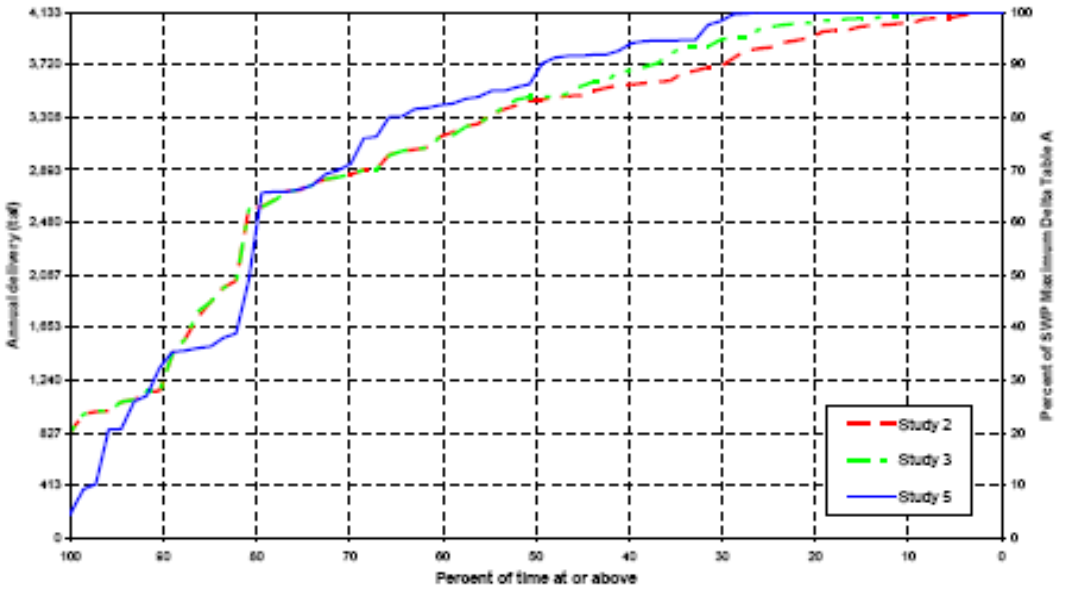


Table 2-4 reflects an assessment of State Water Project reliability by DWR indicating the amount of Table A water allocation available to SWP customers in average and various drought scenarios.

Table 2-4. SWP Delta average and dry-year Table A deliveries (in percent of full Table A)

Study	Average 1922-1994	Single Dry Year 1977	2 year drought 1976-1977	4 year drought 1931-1934	6 year drought 1987-1992	6 year drought 1929-1934
2001	72	19	48	37	41	40
2005	68	4	41	32	42	37
2006	73	19	47	38	41	40
2011	74	20	46	38	14	41
2016	74	20	45	39	40	41
2021	75	20	44	39	40	41
2025	77	5	40	33	42	38

Full Delta Table A = 4.133 maf per year.

Source: State Water Project Reliability Report, 2002, and Draft State Water Project Reliability Report, 2005

Accordingly, the District plans to utilize SWP surface water when available in average or wetter years in gradually increasing amounts as capacity of the Yucaipa Valley Regional Water Filtration Plant is increased from its initial capacity of 12 mgd (13.4 thousand acre-feet [taf]) to 30 mgd (33.5 taf). This analysis indicates that even in severe drought scenarios, the District can expect some water from the State Water Project Additional, DWR generally operates a dry year supply program where agricultural users and others in the Central Valley sell water to the State to make up shortfalls in SWP supply. The District would be able to participate in such purchases. In wet years, the SWP is able to deliver 100 percent or more of Table A allocation, which would allow the District to maximize surface water deliveries in those years and reduce groundwater pumping, thus reserving groundwater supplies for dryer years as necessary.

On November 10, 2005, the Department of Water Resources released a Draft Environmental Impact Statement/Environmental Impact Report for the South Delta Improvements Program. The objectives of this project are:

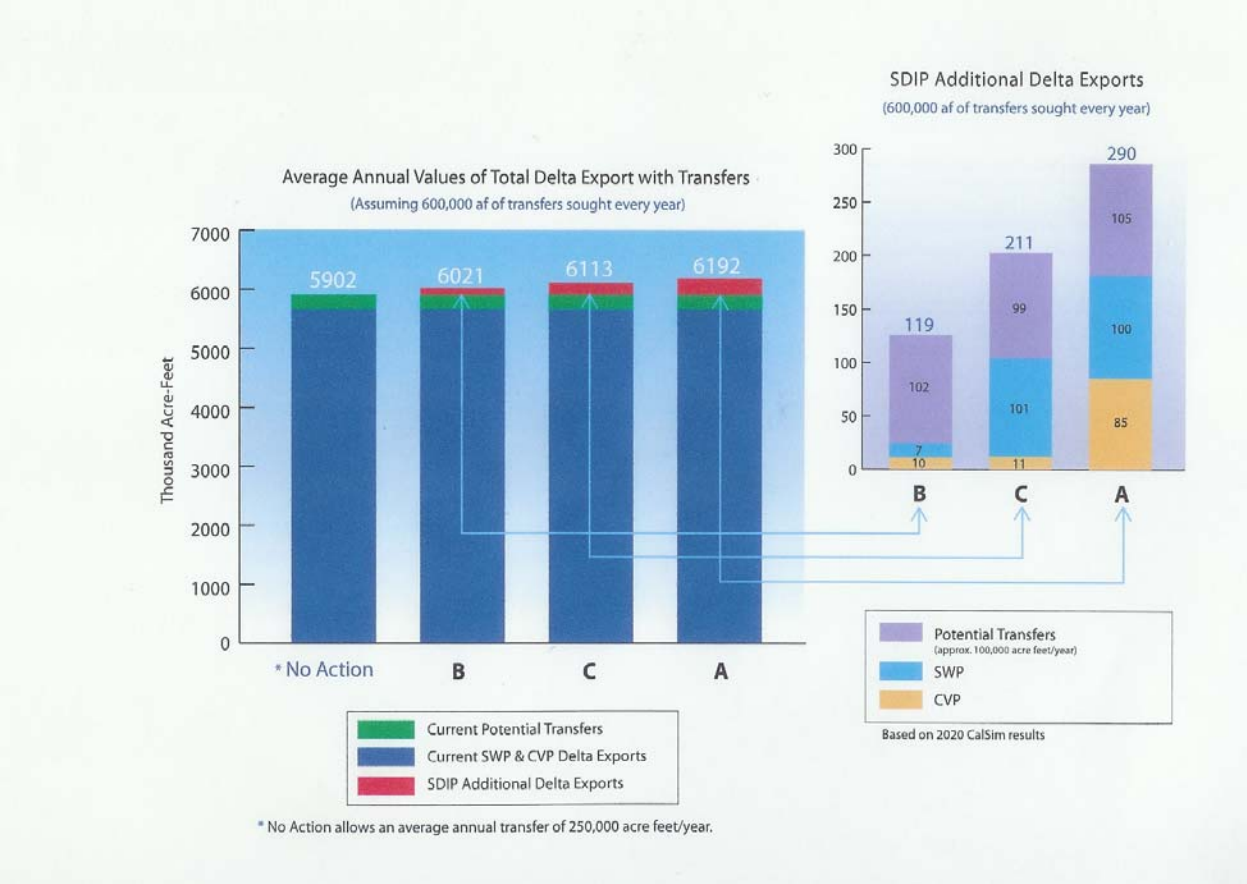
- Reduce the movement of San Joaquin River watershed Central Valley fall/late fall-run juvenile Chinook Salmon into the south Delta via Old River.
- Maintain adequate water levels and, through improved circulation, water quality available for agricultural diversions in the south Delta, downstream of the head of Old River.
- Increase water deliveries and delivery reliability for SWP and CVP water contractors south of the Delta and provide opportunities to convey water for fish and wildlife purposes by increasing the maximum permitted rate of diversion thorough the existing intake gates at Clifton Court Forebay to 8,500 cfs.

These objectives are to be achieved through installation of a permanent operable flow control gate at the Head of Old River, permanent operable flow control gates on Middle, Grant Line Canal and Old River, and dredging portions of Delta channels to improve channel flow. An increase in the permitted capacity for Diversions at Clifton Court Forebay would also be granted.

The Department of Water Resources is pursuing authorization of these activities in a two-step fashion, with consideration of physical components involving in-Delta modifications proceeding first with a subsequent decision on an operational component and any increase in permitted pumping levels. This two-step process will allow further information to be gathered on the status of pelagic fisheries in the Delta which have been in significant decline in recent years and for which there is a lack of sufficient understanding to underpin management changes necessary to arrest the decline and restore fishery health. It is not anticipated that a decision on an operational component will occur before the end of 2006.

If an operational component is approved, State Water Project Table A deliveries could be improved on by just 1-3 percent with increases in available water transfer capacity allowing for a total average increase in delivery capability of 3-5 percent depending on operational scenario. **Figure 2-5** indicates potentially increases supplies as a result of operational alternatives to the South Delta Improvements Project.

Figure 2-5 Delta Export Scenarios South Delta Improvements Project



Reference: South Delta Improvements Program EIR/EIS Draft, Figure 4-2 DWR, 2005.

2.3 Recycled Water

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement,

wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

The California Water Code directs the Department of Health Services (DHS) to establish statewide reclamation criteria where recycled water use may impact the protection of public health. The DHS establishes these criteria in Title 22. Title 22 prescribes bacteriological quality and wastewater treatment level standards for recycled water use. The level of treatment mandated by Title 22 is dependent upon the degree of public contact with the water.

The District has been implementing a recycled water project throughout the 1990s. Recycled water meeting Title 22 requirements is available through the Henry N. Wochholz Wastewater Treatment facility and dual plumbing is currently being installed in new developments. The plant has a rated capacity of 4.5 mgd and is undergoing an expansion and upgrade to a capacity of 6.7 mgd. (Note. 6.7 mgd is based upon the current Title 22 Engineer's Report for the plant expansion. The plant will be re-rated to 8.0 mgd based either upon re-evaluation of UV/membrane performance or the addition of more membranes and UV bulbs in the future). Currently, treated effluent is conveyed through a land outfall and discharged to San Timoteo Creek. Three customers along the existing land outfall are receiving recycled water for irrigation purposes. Delivery amounts are expected to grow to about 6,700 acre-feet by 2020 or about 24 percent of total agency water demands. Ultimately, the District expects to deliver about 8,000 acre-feet per year of recycled water.

The District currently has facilities to use untreated State Water Project water in its nonpotable distribution facilities. Untreated State Water Project water is suitable for nonpotable use and is not subject to the Title 22 requirements for recycled water as it does not contain contaminants

from human origin. The District's Henry N. Wochholz Municipal WWTP is currently undergoing an expansion and upgrade to provide advanced tertiary treatment producing recycled water to meet the Title 22 "disinfected tertiary recycled water" as required for unrestricted recreational use. Future permitting and facilities construction may allow the recycled water to be used in the non-potable system. Recycled water meeting these full Title 22 requirements can be used for all irrigation uses and is generally referred to as "Title 22" water.

The potential exists for the District to increase the amount of water that is beneficially reused within the service area from the existing WWTP. Additional environmental analysis on the potential impacts to San Timoteo Creek and surrounding areas is required before this can occur.

A new Water Reclamation Plant (WRP) is planned to serve the Oak Valley development. This WRP will provide both wastewater treatment as well as a source of recycled water for the Oak Valley area. The Yucaipa Wastewater Master Plan identifies the capacity of the new WRP at 4 mgd, required to serve the needs of Oak Valley as well as other areas of the District from where wastewater could flow by gravity to the new WRP. Based on the projected capacities contained in the Yucaipa Wastewater Master Plan for both treatment plants, there is approximately 11 mgd of wastewater available for recycling.

The District's Recycled Water Master Plan was revised in 2001. This process is currently revising recycled water demands and developing a revised phasing program optimizing the development of recycled water transmission and delivery systems. General system development can be seen in **Figure 2-6**. Current and project wastewater flow and projected recycled water appears in **Table 2-5**. With expanded residential and recreational development in the District, significant opportunities for utilization of recycled water are being capitalized upon.

Table 2-5. Annual Projected Wastewater Supply and Demand

	Available Wastewater Supply (AF/Y)	Nonpotable Water Demand (AF/Y)
2005	5,161	1,120
2010	7,034	1,904
2015	8,194	2,633
2020	9,354	3,361
2025[1]	10,009	3,764

[1]2025 data based upon projection from pro-rated increase in potable water demands, YVWD Water Master Plan.

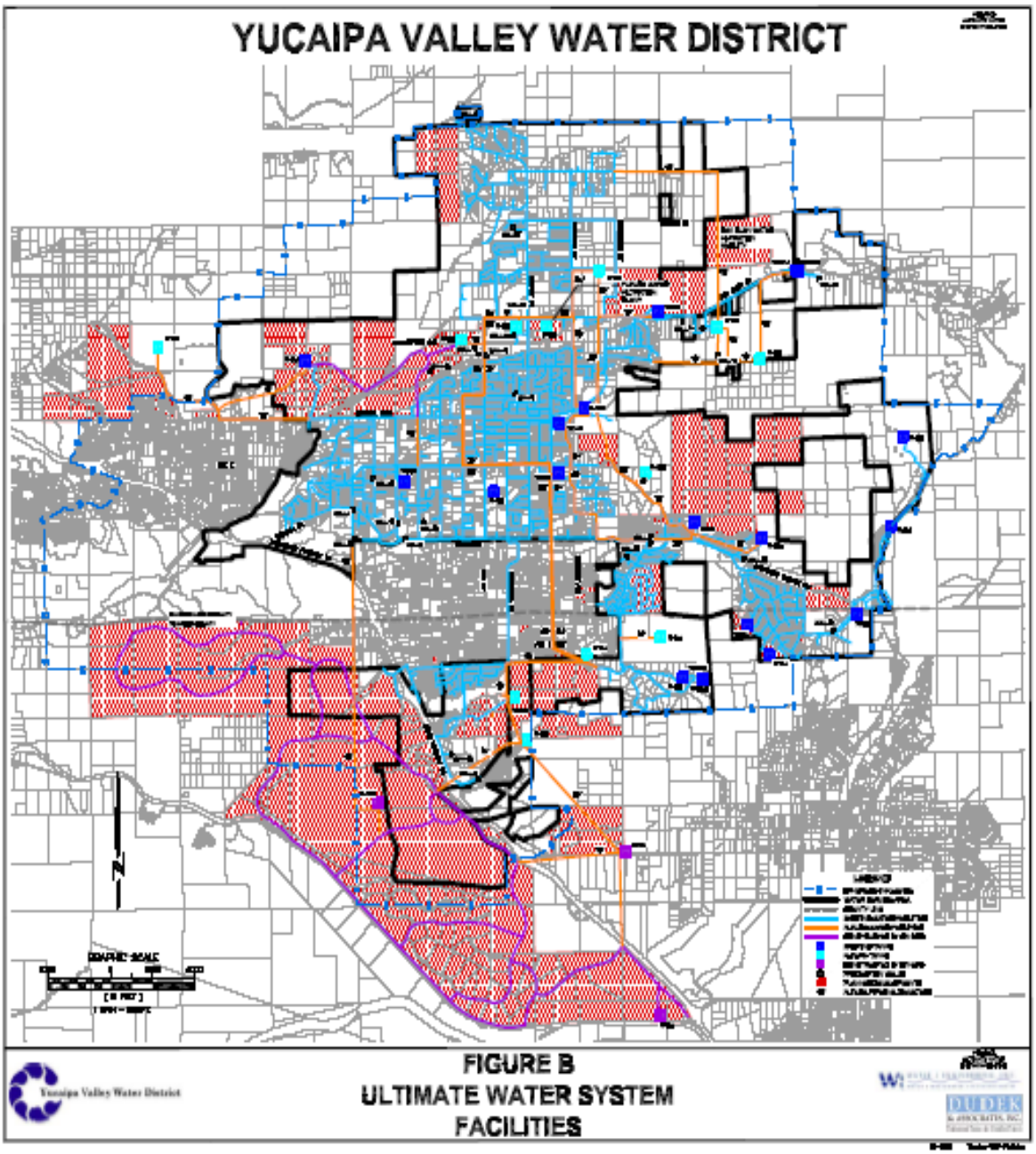
2.4 Water Quality

(a) 10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

The District has traditionally met the bulk of service area customer needs from groundwater. About 2 percent of the current supply comes from surface water. This is expected to change in the near future with the availability of imported water and construction of the Yucaipa Valley Regional Water Filtration Facility (WFF). Delivered water quality exceeds both EPA and state drinking water quality health standards. The new treatment facility will enable the District to continue to meet these high water quality standards into the future.

The District currently operates more than thirty active and standby wells to produce sufficient groundwater to meet the needs of the service area. The majority of these wells are equipped with sodium hypochlorite storage and chemical feed equipment to disinfect the groundwater prior to introduction into the distribution system.

Figure 2-6. Ultimate Water System Development



Groundwater quality test results from 18 of the District's wells is presented in **Table 2-6**
As can be seen from this data, the groundwater quality for Total Dissolved Solids (TDS) is well below the national secondary standard of 500 mg/L for drinking water. The secondary standard is a non-enforceable guideline used to maintain aesthetic effects such as taste, odor and color. Measured nitrate (as NO3) is also well below the EPA (Federal) and State Maximum Contaminant Level (MCL) of 45 mg/L for most wells, although some of the District's wells have experienced high nitrates if not pumped on a regular basis. The District typically will not utilize a well if the nitrate level is about 40 mg/L (as NO3), even though the MCL for nitrate is 45 mg/L. Historically high nitrates have been most prevalent in Well Nos. 16, 26 and 40, however, on less frequent occasions they have been found in Well Nos. 2, 12 and 37 when pumping declines.

Surface water, about 2 percent of the total supply, is currently treated at the Oak Glen Filtration Plant. The Oak Glen Surface WFP is a direct pressure filter package plant and has been on line since October 1996. The treatment processes employed at the WFP include flocculation, filtration and free chlorine disinfection (using hypochlorite). The existing rated capacity of the WFP is 450 gpm. (Note. This is based upon the DHS tracer study rating). The site layout was designed to accommodate an expansion to 900 gpm.

Introduction of imported water to be available from the State Water Project (SWP) provides the District with the opportunity to reduce overdrafting of the groundwater basin. Use of SWP water will require construction of the Yucaipa Valley Regional Water Filtration Facility (WFF). The Regional WFF will be designed to be capable of treating imported SWP water as well as local water from Mill Creek and the Santa Ana River. The ultimate size of the Regional WFF will accommodate the demands of the District's service area and will be capable of providing treated water to the City of Redlands, Beaumont-Cherry Valley, Western Heights Water Mutual Company and South Mesa Mutual Water Company areas as well. **Figure 2-7** shows projected phased water system improvements for conversion to State Water.

Table 2-6. YVWD Groundwater Quality Test Results 1992 – 2001

Source Water	TDS[1, 2]		Nitrate[1, 2] (as NO_3)		Production Capacity gpm
	Max mg/l	Min mg/l	Max mg/l	Min mg/l	
Well No. 2	276	301	33	26	1,091
Well No. 10	260	256	20	15	755
Well No. 11	314	n/a[5]	38	33	622
Well No. 12	290	288	30	25	969
Well No. 16[4]	*286*	*265*	*<1*	*ND[3]*	*400*
Well No. 18[4]	*226*	*300*	*15*	*8*	*941*
Well No. 24	307	279	33	25	860
Well No. 27[4]	*343*	*336*	*20*	*19*	*250*
Well No. 35	330	294	40	9	270
Well No. 44	218	202	29	5	695
Well No. 46	265	259	11	7	660
Well No. 48	212	175	11	9	1,850
Well No. 51[4]	*358*	*331*	*29*	*19*	*2,250*
Well No. 53	209	n/a[5]	12	<2	375
Well No. 60	244	n/a[5]	ND[3]	n/a[5]	1,350
Well No. 61[4]	*240*	*227*	*<2*	*ND[3]*	*110*
Well No. 75[4]	*189*	*160*	*9*	*5*	*125*
Oak Glen	304	263	5	4	500
Maximum	**358**		**40**		
Average	**271**	**262**	**22**	**15**	

[1] Based on available data.

[2]Maximum Contaminant Level (MCL) for Nitrate = 10 mg/l and 45 mg/l as NO_3.
MCL = 1,000 mg/l for TDS, however, typically regulated based on secondary standard of 500 mg/l. Secondary standard is non-enforceable guideline to maintain aesthetic effects (i.e., taste, odor and color).

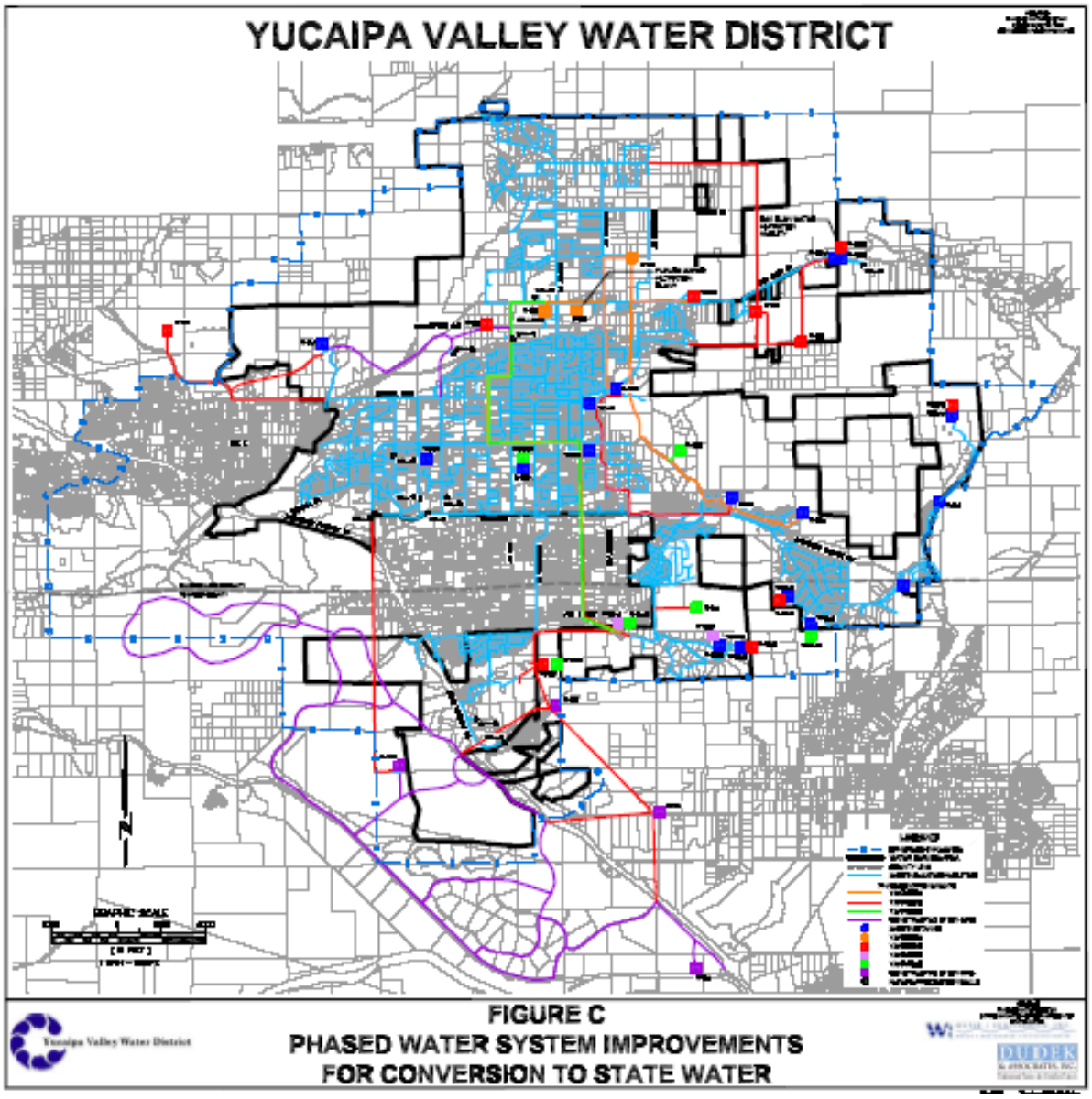
[3]Constituent not detectable in sample using stipulated testing procedure.

[4]*Well has less than 10 years expected service life remaining.*

[5]Information not available.

Source: YVWD Water Master Plan

Figure 2-7. Phased SWP Project Improvements



Finished water quality goals were established for the plant during the preliminary design. Finished water quality goals are based on regulatory requirements and aesthetic expectations. The recommended treatment scheme for the Regional WFF includes raw water storage, flocculation, sedimentation, membrane filtration, chlorine disinfection and final product water storage. Space will also be provided for possible future treatment using nanofiltration or reverse osmosis and ultra violet irradiation.

2.5 Desalinated Water

> *10631. (i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.*

The YVWD Water Supply Renewal Project includes reverse osmosis membrane treatment at the new WFF and a brine disposal pipeline. The membrane treatment will allow the TDS of imported water to be lowered, resulting in better water quality infiltration to the groundwater basin from irrigation practices and groundwater recharge, and maintaining wastewater TDS levels within ranges allowing for recycling. The brine line will eventually be extended to the City of Beaumont for use in a future City recycled water desalination project. This facility will allow for the increased use of recycled water and eliminating the need for a wastewater discharge to San Timoteo Creek, thereby allowing YVWD to achieve a zero-discharge status.

2.6 Water Transfers

> *10631. (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.*

As described in **Section 2.2**, above, the Santa Ana-Mill Creek Cooperative Water Project Agreement permits YVWD to exchange up to 32 cfs of SWP water for Mill Creek water when available. This source is highly variable, depending upon local hydrology. Lack of storage limits the ability to use this water during dry years.

The SWP supply will also allow the District to participate in dry year purchase programs of water supply arranged by the Department of Water Resources, through the San Bernardino Valley Municipal Water District, the San Gorgonio Pass Water Agency, or pursue individual

District initiated transfers as may be necessary and as supplies may be available. The District has not initiated nor does it have plans to initiate any short or long-term transfers for water at this time.

2.7 Planned Water Supply Projects

10631. (h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

The Yucaipa Valley Regional Water Supply Renewal Project is an innovative salinity control project that will effectively eliminate the buildup of minerals in the Yucaipa Valley/San Timoteo Watershed (the Yucaipa Basin and portions of the Beaumont Basin). Coupled with YVWD's recycled water program, this project will minimize the amount of water imported from the fragile Bay-Delta ecosystem in northern California and allow for the maximum use of high-purity recycled water. This project will ultimately reduce demands on the California State Water Project by over 4 billion gallons per year, enough to support 27,000 families. The project has multiple benefits for the watershed, the region and the state: increased water supply reliability, groundwater protection, and water quality improvements.

The project consists of two components: a 5 mgd reverse osmosis (R/O) desalinization treatment facility, and a brine disposal pipeline. Imported water will be processed through the R/O treatment facility *before* being used by residents as potable drinking water or raw irrigated water. The project will lower the TDS of the potable water supply for direct use and groundwater recharge in the San Timoteo Watershed area. Indirectly it will lower the TDS in the groundwater basin by lowering the TDS of applied irrigation water (non-potable and reclaimed). The project will also protect water quality in the lower Santa Ana Watershed by maintaining high quality water in the upper watershed, and facilitate the increased use of recycled water,

thereby allowing YVWD would achieve a zero-discharge status, providing the ultimate protection of downstream water resources consistent with the goals of the Clean Water Act. The brine disposal pipeline will eventually be extended to the City of Beaumont for use in a future city recycled water desalination project.

The project will also protect the groundwater basin through the export of concentrated salt brine, reduce overdraft of the watershed by reducing dependence on groundwater, and desalting water supplies that recharge the groundwater basin.

2.8 Water Supply Reliability Strategy

10631. (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.

(2) A single dry water year.

(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

Despite rapidly growing demands on the District, ample opportunities exist to provide a reliable supply for the community through to its ultimate build-out. In the near term the District will stabilize its demands on the groundwater basins, continue developing recycled water and utilize surface water for direct delivery to customers to meet increased demands. Surface supply availability from the State Water Project, San Bernardino Basin Bunker Hill Pressure Zone, Mill Creek and Santa Ana River can be used interchangeably depending upon local and statewide hydrology to supplement a stable local groundwater yield. Additionally, the District will

incorporate recycled water delivery systems into new development, focusing service of new irrigation demands on recycled water. Recycled water will give the District a new local source of water of high reliability, both lessening the dependence on imported sources and increasing reliability of the District's total supply.

Table 2-7 depicts how demands will be met under typical conditions when ample SWP water is available, under single dry year conditions, and multiple dry year conditions. This table assumes in the single dry and multiple dry years that only a 20 percent supply of SWP Table A entitlement to the San Bernardino Municipal Valley Water District is delivered to SBVMWD (20,500 AF) and that Yucaipa receives 10 percent of this supply, or roughly 2,000 AF, which is deemed conservative. In multiple dry years, SBVMWD should receive up to 40 percent of their entitlement (see **Table 2-4**) and dry year water transfers from willing sellers in the system could improve this amount further.

Full entitlement deliveries of SWP water may not be available in many dry years. The District then will have to rely more heavily upon groundwater. In some extensively dry years no SWP water may be available or the District may be asked to forgo SWP supplies to allow those without access to other options, to use available SWP supplies. The District could, for a number of years in the near-term, meet its needs without SWP water. The local groundwater basin could be temporarily overdrafted to accommodate these losses. In subsequent years, when wetter conditions prevail, additional SWP water could be delivered and local groundwater production reduced to allow for in-lieu groundwater recharge (see **Section 4.0** description of three-year water supply). Further out, in 2020 and beyond, the current expected limit of groundwater pumping capacity would require some supplemental surface water deliveries to avoid shortages. However, given the small magnitude of projected shortages and the options available to supplement supplies or reduce demands (increased groundwater production capacity, in or out of basin transfers, additional drought conservation) the District is well poised to address any likely scenario. As demands grow and reliability issues surrounding the SWP become more clear, future UWMPs and Water Supply Master Plans can address changes in the water supply outlook

and plan infrastructure modifications accordingly to avoid or limit shortages to acceptable ranges.

Table 2-7. YVWD Water Demand, Average Supply, Single Dry Year and Multiple Dry Year Projections

Year	Demand		Average Water Supply				Single Dry Year Water Supply					Multiple Dry Years				
	Potable	Non potable supply	SWP treated supply	Ground-water	Non potable supply	Shortage %	SWP treated supply	Other surface water	Ground-water	Non potable supply	Shortage %	SWP treated supply	Other surface water	Ground-water	Non potable supply	Shortage %
2005	14,400	1,300	0	14,400	1,300	0	0	0	14,400	1,300	0	0	0	14,400	1,300	0
2010	16,100	2,500	4,480	11,620	2,500	0	670	0	16,100	2,500	0	670	0	16,100	2,500	0
2015	17,800	3,800	4,480	13,320	3,800	0	670	0	17,800	3,800	0	670	0	17,800	3,800	0
2020	19,400	5,000	4,592	14,808	5,000	0	2,000	0	18,825	5,000	0	2,000	0	18,825	5,000	0
2025	21,200	5,500	5,152	16,048	5,500	0	2,000	0	18,825	5,500	1.4	2,000	0	18,825	5,500	1.4

[Maximum Groundwater production is currently expected to be 18,825 AF/Y]

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Section 3. Demand Management Measures

3.0 Introduction

DMMs (Demand Management Measures) refer to a subset of conservation methods a water supplier may undertake to reduce demand on the water system. The Urban Water Management Planning Act requires a description of 14 specific conservation and DMMs listed below in **Section 3.1**. These measures, also known as the Best Management Practices or BMPs, are described in the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). The MOU is an agreement among many of California's urban water agencies to implement water conservation measures, or BMPs. Signatory agencies agree to fulfill BMPs within timetables that are specific to each BMP, to the extent the BMPs are cost-effective. The MOU was first adopted on December 11, 1991, and was last amended on March 9, 2005.

For those measures not being currently implemented or planned for implementation, an evaluation of those measures and a comparison against expanded or additional water supplies must be made. Preference in the Urban Water Management Planning Act is given to those measures offering lower incremental costs than the costs of expanded or additional supplies. The act also requires that economic and non-economic factors, including environmental, social, health, customer impact and technological, be considered in the evaluation. However, no specific guidance on evaluation methodology is given.

3.1 Demand Management Measures Under Implementation

10631.(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.
(B) Residential plumbing retrofit.
(C) System water audits, leak detection, and repair.
(D) Metering with commodity rates for all new connections and retrofit of existing connections.
(E) Large landscape conservation programs and incentives.
(F) High-efficiency washing machine rebate programs.
(G) Public information programs.
(H) School education programs.
(I) Conservation programs for commercial, industrial, and institutional accounts.
(A) Wholesale agency programs.
(K) Conservation pricing.
(L) Water conservation coordinator.
(M) Water waste prohibition.
(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

Table 3-1 summarizes the District's current status in implementing the 14 water conservation measures (DMMs or BMPs) listed in the Act and MOU.

In the following sections, a status of District programs is provided for each DMM recommended in the Act. Three types of information are given: 1) A description of the water conservation measure, 2) implementation or scheduled implementation for each measure, and 3) methods to evaluate the effectiveness of each measure, where it is being implemented or planned for implementation.

The Act also requires that an estimate be provided of how much existing conservation savings have reduced demand and whether those reductions limit the supplier's ability to further increase efficiency and respond to water shortages. This phenomenon is known as "demand hardening."

Table 3-1. Implementation Status for Demand Management Measures

Demand Management Measure	Currently Implemented
1) Water survey programs for single-family and multi-family residential customers	No
2) Residential plumbing retrofit	No
3) System water audits, leak detection, and repair	Yes
4) Metering with commodity rates for all new connections and retrofit of existing connections	Yes
5) Large landscape conservation programs and incentives	No
6) High-efficiency washing machine rebate programs	No
7) Public information programs	Yes
8) School education programs	No
9) Conservation programs for commercial, industrial, and institutional (CII) accounts	No
10) Wholesale agency programs	Not applicable to YVWD
11) Conservation pricing	Yes
12) Water conservation coordinator	To be implemented 2006
13) Water waste prohibition	Yes
14) Residential ultra-low-flush toilet (ULFT) replacement program	No

The District's active demand management programs include public information, target replacement of leaking delivery lines and faulty meters, and landscape design review for new development. However, no empirical estimate is available for the effect of this existing conservation effort and its effect on the District's ability to further reduce demand. It is recognized that much passive conservation is occurring due to public information efforts, the development of a changed water ethic due to the 1987-1992 drought, district water pricing policy and, in particular, plumbing code amendments that eliminate high-flow showerheads, faucets, and toilets for new installations or replacement.

It is estimated that such passive conservation has lowered demands by about 10 percent (DWR Bulletin 160-98). Additionally, generally less conservation potential exists in rapidly growing regions such as that served by the District, as the housing stock tends to be newer and has already incorporated low water-use appliances. This new stock, however, does provide an ongoing opportunity for outdoor savings, as such new stock invariably incorporates automatic irrigation systems that must be monitored for maximum efficiency.

The status of District programs is provided below, including program descriptions, implementation schedules, and evaluation methods for those programs currently being implemented.

(1) Water survey programs for single-family residential and multi-family residential customers.

***Program Description*.** This DMM concerns water efficiency surveys in residential settings. These programs generally involve sending a qualified water auditor to customer locations to audit water use. Interior water-using fixtures are assessed, and where leaking or high-flow devices are noted the customer is informed. Exterior audits of irrigation systems are often included, from simple audits looking for leaks and broken sprinklers, checks of the system times and development of irrigation schedules, to irrigation uniformity audits. Programs can include provision of low-flow showerheads, toilet flappers, and toilet displacement devices.

Implementation. This program is not being implemented at this time. However, customer-side leaks were detected through implementation of (3) System Water Audits, below, which were reported to customers. Also, District customers receive both current and previous year water usage, graphed by month, on their monthly bills for a comparison of usage.

(2) Residential plumbing retrofit.

Program Description. These programs include two general components: 1) working with the land use jurisdictions to determine effectiveness of enforcing plumbing standards, and 2) distributing and/or installing retrofit kits including high quality, low-flow showerheads, toilet

displacement devices, faucet aerators, and toilet flappers to pre-1992 housing. Few agencies find it cost-effective to fund or monitor land use jurisdiction's enforcement of plumbing standards. Given that the standards require manufacture of these low-flow devices and that is all that is available on the legitimate retail market, such activity is deemed unnecessary.

Implementation. This program is not being implemented at this time.

(3) System water audits, leak detection, and repair.

Program Description. These audits compare total water sales against water production to ensure that water that is unaccounted for does not exceed 5 percent, the generally accepted industry standard for unaccounted water. Prior to 1984, the District loss rate was about 15 percent. Through an aggressive program of meter retrofits and a leak reduction program, this figure has been brought down to the industry standard of 5 percent.

Implementation. The District conducts prescreening system audits on an annual basis to determine the need for a full-scale system audit.

A summary of system surveys is as follows:

- Project Date: March 18, 2002 to March 22, 2002

  A total of approximately 16.64 miles of the system were surveyed, detecting 11 system leaks with a combined annual savings of 2,496,600 gallons. Four consumer leaks were detected and reported to customers. The cost of the survey was about $4,000.

- Project Date: December 8, 2003 to December 19, 2003

  A total of approximately 53.1 miles were surveyed, detecting 10 system leaks with a combined water savings of 8,278,200 gallons. Nine consumer leaks were detected and reported to customers. The cost of the survey was approximately $10,000.

The next system leak detection survey is scheduled for 2007. In addition, the District conducts detailed audits when unaccounted water exceeds 5 percent. For example, in response to drainage

seepage from a retaining wall, no District leaks or customer leaks could be found at the source of the water seepage. The District conducted a one-day system/customer survey in the area as final confirmation to eliminate District water at the source.

Methods to Evaluate Effectiveness. As stated above, the District reviews records to confirm system water losses do not exceed 5 percent. Where unaccounted water exceeds 5 percent, detailed audits are performed.

(4) Metering with commodity rates for all new connections and retrofit of existing connections.

Program Description. This program includes metering connections and billing by volume of use.

Implementation. The District implements metering and commodity rates for its residential water services with a tiered or inclining block rate structure and five tiers or blocks, with inclining rates based on increased usage. Sewer rates are flat rates for residential service. Commercial and industrial water and sewer service is a flat rate based upon an equivalent service unit.

Methods to Evaluate Effectiveness. No methods have been identified that can segregate rate effects from other conservation measures as the District is fully metered. Metering has been shown in other areas to save 15-30 percent over flat rate, unmetered rate structures.

(5) Large landscape conservation programs and incentives.

Program Description. These programs generally identify large landscapes over three acres (such as schools, parks, golf courses, and other commercial, industrial, and institutional (CII) customers), offering surveys and development of ETo-based water budgets. Billing information is often correlated with water budget. Irrigation system training is offered, often in a multilingual format. Financial incentives can be offered through ETo-based rate structures to encourage efficient use. Incentives can also be given for irrigation system retrofits and subsidies for irrigation training.

Implementation. This program is not being implemented at this time. The District is currently focused on providing all large landscapes recycled water and will follow that effort with conservation programs that improve efficiency of that water use.

(6) High-efficiency washing machine rebate programs.

Program Description. This program involves offering customers incentives for installing high efficiency washing machines.

Implementation. This program is not being implemented at this time.

(7) Public information programs.

Program Description. This program involves educating the public about water use and efficiency.

Implementation. The District is implementing a public information program that includes information on interior and landscape water conservation and maintenance of a xeriscape garden.

Methods to Evaluate Effectiveness. This BMP cannot be reduced to quantitative terms, but is considered an essential complement to other BMP measures and developing a water conservation consciousness and ethic among urban water users, such that it is considered an essential practice. No methods have been identified to evaluate the effectiveness of this program.

(8) School education programs.

Program Description. These programs generally consist of providing teacher training materials and teacher in-service training to elementary (4^{th} grade) and above. Materials consist of general information regarding the water cycle, information on California's water system, groundwater resources, drinking water quality, and the role of individuals in water conservation and water quality protection.

The intent of the materials and in-service training is to educate educators about California's water system and the need for a conservation ethic, and to have those teachers incorporate this information into the curriculum for their classrooms. A populace with basic education on water issues assists in resolving water supply and water quality problems. Some districts develop their own materials and provide in-classroom instruction. Others utilize materials from the non-profit organization, the Water Education Foundation, and their in-service teacher training programs, whose materials are consistent with the standards of California's Framework for Science and History/Social Science Education. A variety of programs are available from the Foundation along with in-service training for those programs.

Implementation. This program is not being implemented at this time.

(9) Conservation programs for commercial, industrial, and institutional accounts.

Program Description. These programs consist of identifying and ranking by water use CII accounts, and offering surveys and/or incentives for conservation where the surveys indicate an opportunity for conservation. Water-consuming devices in the CII sector of the District are primarily plumbing fixtures and landscape irrigation at commercial and institutional sites. There is no manufacturing in the service area of a significant scale.

Implementation. No program is being implemented at this time.

(11) Conservation pricing.

Program Description. This program applies to both water and sewer services. Conservation pricing provides incentives for customers to reduce average or peak use, or both. Rates are designed to recover the cost of providing service, and billing for water and sewer service are based on metered water use. This pricing is usually characterized by rates in which the unit rate increases as the quantity used increases (increasing block rates).

As noted above, the District practices conservation pricing for its water service with a commodity rate structure that includes five tiers. However, sewer service is based upon a flat

service charge for residential customers, and charges are based upon equivalent service units for commercial and industrial customers.

Implementation. This program is already being implemented by the District for water services. With an incentive to conserve structured in the water rate, it is deemed unnecessary to attempt to construct a commodity rate structure for sewer service. Additionally, the accuracy of such rate structures, which rely on a formula based on water consumption, are questionable as they generally assess charges based upon winter season demands, which vary depending on hydrology of a given year and landscaping demands.

Methods to Evaluate Effectiveness. The effectiveness of this program can be evaluated by longitudinal studies reviewing billing consumption records and pricing structure for a sampling of housing units over time.

(12) Water conservation coordinator.

Program Description. This program consists of designating a water conservation coordinator among the staff of the District or hiring a new person for the function. The person oversees and coordinates the District's conservation programs and BMP implementation.

Implementation. This program is being implemented in 2006. The District appointed a Recycled Water and Water Conservation Coordinator in early 2006. That person's function, in part, will be to upgrade the District's conservation program and improve BMP implementation.

(13) Water waste prohibition.

Program Description. This program consists of implementing methods that prohibit gutter flooding, single pass cooling systems in new connections, non-recirculating systems in all new conveyer car wash and commercial laundry systems, and non-recycling decorative water fountains.

Implementation. The District has adopted a water waste prohibition ordinance.

Methods to Evaluate Effectiveness. The District tracks water waste complaints and outcomes of investigations.

(14) Residential ultra-low-flush toilet replacement programs.

Program Description. This program consists of measures to replace older 7 gallon (gal)/flush and 3.5 gal/flush toilets with 1.6 gal/flush toilets. Agencies have approached this program generally in three ways: 1) Requiring a retrofit on resale ordinance where homes are required to retrofit to low-flow fixtures upon a resale; 2) direct distribution of toilets to local community groups who oversee installation; and, 3) rebate programs where vouchers or rebates are given for toilet replacement.

Implementation. No program is being implemented at this time.

3.2 Evaluation of Demand Management Measures not Currently being Implemented

10631. (g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

While Water Code Section 10631 (g) specifies elements of the evaluation methodology, considerable room for professional judgment on how to address each element remains with the analyst. In 2003 the District completed a Water Conservation Feasibility Study, which evaluated water conservation options for the District. One set of options was straightforward compliance

with the BMB MOU. This study is attached as **Appendix A.** The study determined that the avoided cost savings of indoor conservation programs was $352/AF, $292 for small landscape conservation programs and $138 for large turf conservation programs, recognizing that the large landscape conservation programs would defer use of recycled water.[1] The study evaluated the costs of BMP programs against the avoided cost savings of conservation as noted above and summarized the savings in Table 7-2 of the study, reproduced herein as **Table 3-2**. Non-economic benefits were also considered in the study but no attempt was made to monetize these benefits.

Table 3-2. Cost-Effectiveness of BMPs

Program	PV[a] Costs ($/AF)	PV Benefits ($/AF)	B/C[b] $	NPV[c] $
BMP 1, Survey Single Family (SF)	81,329	88,214	1.08	6,885
BMP 1, Survey Multi-Family (MF)	14,066	11,629	0.83	(2,437)
BMP 2, Retrofit SF	9,429	11,506	1.22	2,077
BMP 2, Retrofit MF	3,271	3,992	1.22	721
BMP 5, Lg. Land: Dedicated Meters	45,559	236,673	5.19	191,114
BMP 5, Lg. Land: Mixed Meters	1,850	3,101	1.68	1,251
BMP 9, CII ULFT	38,318	46,103	1.20	7,785
Bmp 14, Res. ULFT SF	65,244	71,495	1.10	6,251
Bmp 14, Res. ULFT SMF	41,642	43,939	1.06	2,297
Totals	**300,708**	**516,651**		**215,943**

[a]Present Value
[b]Benefit-cost Ratio
[c] Net Present Value

As shown in **Table 3-2**, each of the BMPs studied showed a net positive benefit-cost ratio except for BMP 1, Multi-family water surveys, based upon the assumptions used in the Feasibility Study. BMP 6, high efficiency washing machine rebate programs, was not included in this table, though average savings were cited at page 5-8 of the feasibility study. However, assuming a $150 rebate as sufficient incentive to replace a washing machine with a high-efficiency machine and a 10-year life, a simplified analysis shows that such a program would be cost effective for at least commercial-industrial use settings where a positive benefit cost ratio would exist, as shown

[1] Water Conservation Feasibility Study, table 6-2

in **Table 3-3**. With energy savings that accrue to the homeowner, rather than the District, residential programs would be cost-effective overall.

Table 3-3. Cost Effectiveness for High Efficiency Washer Rebate

	Water savings				Rebate	Benefit
Use Setting	gal/day	gal/yr	af/yr	$/y saving	Cost/yr	Cost
Single family	13.9	5073.5	0.015568	$ 5.48	$ 15.00	0.37
Multi-family	27.8	10147	0.031135	$ 10.96	$ 15.00	0.73
Commercial	41.8	15257	0.046815	$ 16.48	$ 15.00	1.10

The District's imported water and recycled water programs, which have incremental costs in excess of the BMP programs noted in **Table 3-2**, are funded through District rates and revenues. While implementation of BMPs can help extend the utility of these supply investments, given the magnitude of growth within the District, they are not a suitable substitute recognizing the limited total savings potential versus the amount of new water needed to sustain the community in future years. The opportunity remains to take advantage of such conservation programs in future years, however.

The District has the legal authority as a County Water District to implement conservation programs of its choosing and require compliance with such programs as a condition of water service to its customers.

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Section 4. Water Shortage Contingency Plan

4.0 Introduction

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

The District adopted its current Water Shortage Contingency Plan on January 30, 1992. This Plan builds on that original plan, as well as the District's experience in implementation during the 1987-1992 drought, and changed requirements under the law.

4.1 Three-Year Minimum Supply

The District currently relies on groundwater to provide over 95 percent of its supply needs. Given the large capacity of the basin, current storage volumes, and current and near-term well capacity, in the near term the District should be able to meet full service demands in a hydrologic shortage regardless of the hydrology. Therefore, the driest three-year sequence on record is not immediately relevant. Some curtailments due to current summertime peak capacity limitations, rather than hydrologic limitations could occur, however.

When SWP water and access to other surface waters come on line in 2007, the system will be able to maintain nearly 100 percent reliability over any three-year dry cycle sequence. The Yucaipa Valley Regional Water Filtration Plant (YVRWFF) will be producing potable water in March 2007 and has the capacity to provide 12 million gallons per day (mgd). The District's average daily demand (from 2004 data) is 10.36 mgd, with a winter average daily demand of 5.28 mgd, and a summer average daily demand of 16.16 mgd.

Aggressive recycled water development will also underpin overall supply reliability and lower demands on inconsistent imported water resources. Ultimately, if total surface water supplies become unacceptably unreliable, the District can develop additional well capacity to match total overall demands, minus the amount of recycled water available. In this way, droughts can be managed through conjunctive use of the groundwater basin: drawing down the basin in hydrologic shortages and recharging the basin during supply availability surpluses in wetter years.

For the next five years and beyond, the District will be able to meet 100 percent of the full demands with groundwater and recycled water. Based upon experience shown at the El Dorado Water District, as well as District experience and projections, it is estimated that 60 percent of average household water demands can be met with non-potable/reclaimed water, and 40 percent with treated potable water for dual plumbed homes (most future large tracts and tracts adjacent to the existing non-potable water system). The 60/40 ratio is probably good for the District overall

as well, when considering that large landscape irrigation customers (e.g., parks, golf courses, etc.) will be using non-potable/reclaimed water.

In addition, in the event that SWP water is unavailable in a given year, alternative surface supplies include the following, in order of priority:

(1) Mill Creek Water
(2) Imported San Bernardino groundwater
(3) Seven Oaks Dam. Currently, there are significant water quality issues with any excess impounded water behind the Seven Oaks Dam. The issue is being addressed, but will probably take a long time for a permanent solution. The water quality issues have pre-empted the allocation issues at the moment.
(4) Santa Ana River (East Valley and Redlands will get the first draw on available waters).

All the options are subject to the San Bernardino Municipal Water District's operations. The first and second options of Mill Creek and imported San Bernardino groundwater are the best likelihood, although the San Bernardino groundwater is dependent upon additional facilities to be constructed.

4.2 Drought Management

Water shortages can be triggered by a hydrologic limitation in supply, e.g., a prolonged period of below normal precipitation and runoff, limitations or failure of supply and treatment infrastructure, or both. Hydrologic or drought limitations tend to develop and abate more slowly, whereas infrastructure failure tends to happen quickly and relatively unpredictably. Additionally, California's imported water supply system is vulnerable to unpredictable restrictions on water storage and delivery due to conflicts with sensitive aquatic species.

California's climatic regime is one typified by distinct seasonal patterns of precipitation and cyclical patterns of a number of years of above or below average precipitation. Therefore, water systems and management mechanisms need to be able to cope with these variations. The Act requires water agencies to plan for varying levels of temporary or prolonged shortages of up to

50 percent of normal supplies. This Plan segregates water shortage scenarios into five stages, outlining progressively more restrictive requirements on water users as shortages become more pronounced.

Customers and the general public will be kept informed of water shortage management actions of the District through direct mail (as necessary) along with water billings, and at all times through the District's website. A link to the California Department of Water Resources' website location for water supply information will be provided on the site (http://cded.water.ca.gov/water_supply.html).

4.3 Catastrophic Events

Over the past ten years, the District has been upgrading its supply infrastructure to better meet the needs of its customers. Additionally, the age of the District's infrastructure is relatively young with only 3 percent of the pipeline inventory over 35 years old. However, the District is in a very active seismological area and is also subject to power outages that can limit production from wells and the District's planned treatment plant for imported water. The District has available diesel back-up power generation capability for its well system and treatment plant. Backup power units are portable and can be moved from well site to well site depending upon the location and extent of outage.

In addition to being able to invoke the water shortage contingency actions as stated herein, the District in 1998 adopted a Major Disaster Plan and Alerting Procedures. This plan deals with non-drought related water shortages, such as those that might result from earthquakes, power outages, pipeline ruptures, terrorism threats, and water quality limitations/contamination. It outlines the responsibilities of the District's designated emergency response personnel, alerting procedures, alternate headquarters, communications, transportation, and relationships with regional and state emergency response officials. District water supply facilities are operated though an independent and reliable radio and telemetry network designed to operate under emergency conditions.

In addition to in-house emergency plans and procedures, the District is a member of the WARN (Water/wastewater Agency Response Network), a program whose mission is to provide statewide emergency preparedness, disaster response, and mutual assistance matters for public and private water and wastewater utilities. The District also coordinates disaster preparedness and response with the City of Yucaipa, the primary responder for the bulk of the District's service area.

4.4 Water Shortage Response Stages, Prohibitions, and Penalties

This Plan, as introduced previously, provides for five levels of progressively more aggressive water demand reduction requirements as displayed in **Table 4-1**.

Table 4-1. Water Shortage Response Stages

Stage	Type Program	Water Use Reduction	Overall Reduction
I	Voluntary	10% from selected areas	--
II	Voluntary	Up to 15% district wide	15%
III	Mandatory	Up to 30% district wide	30%
IV	Mandatory	Up to 40% district wide	40%
V	Mandatory	Up to 50% district wide	50%

Drought events that trigger these stages will likely be those affecting imported water sources, provided the Yucaipa groundwater basin continues to be managed in a safe yield condition over the long term. As such, the amount of imported water shortage imposed by wholesalers to the

District, San Bernardino Valley Water District, and the San Gorgonio Pass Water Agency, will in most instances drive the required stage. Additionally, to the extent well capacity exists, the Yucaipa basin can be temporarily exercised beyond its long-term safe yield. The shortage response stages may also be invoked during a non-drought water emergency to handle short-term events, such as earthquake damage, pipeline ruptures, and water quality problems.

The stages were developed based upon recognition of the need for equity and recognition of the priority for health and safety issues during the extreme shortage conditions. Through the water allocation system, the stages also recognize the variation in water use within a customer class. The system attempts to recognize prior conservation by allocating set amounts per use, with partial modification of allocations based upon prior use.

While certain water use prohibitions apply at each stage, in stages III-V the plan balances between achieving savings through those prohibitions and providing an allocation for users to apply as they deem appropriate, consistent with obeying the prohibitions. This allows the individual consumer to exercise independent judgment as to how best to use their allocation.

The District Board of Directors will determine the appropriate stage of implementation, although they may delegate the authority to implement Stage I or II to the General Manager. Triggers for consideration of invoking a specific stage of the Contingency Plan will be notification from the District's water wholesalers, the San Bernardino Valley Water District and the San Gorgonio Pass Water Agency, collectively or individually, that those districts intend to curtail imported water deliveries to the District. For example, where imported water requested deliveries are expected to be curtailed by 10 percent, a Stage I action will be considered. Where deliveries are expected to be curtailed by up to 15, 30, 40 and 50 percent, respective shortage stages will be considered (Stages II-V). Inasmuch as imported supplies will make up only a portion of District supplies, the District will determine the total supply available and the likely duration of the imported water shortage, and invoke the appropriate stage to reduce overall demands to available supply. As shortage conditions ease, the District will consider relaxing the shortage stages based upon notification from wholesalers that supply conditions are improving.

Use restrictions, as follow, other than water waste ordinance provisions, shall not apply to the use of recycled water.

4.4.1 Stage I Actions – Up to 10 Percent Shortage

The District has significant geographic variation in its water consumption, particularly in residential areas, due to land use and a variety of pressure zones. Under Stage I, the relatively high water consuming areas would be asked to implement the following measures on a voluntary basis.

Prohibitions

- Landscape watering on an odd-even day basis based upon address number, and avoiding irrigation between 0800 and 1700 hours.
- Elimination of hosing of hardscape surfaces, except where health and safety needs dictate.
- Usage of buckets and automatic hose shut-off devices for car washing and outside cleaning activities.
- Water leak repair and adjustment of sprinklers to eliminate over-spray.

Other Actions

- The District shall notify customers in the target areas of the shortage and indicate requested curtailments of use. Such notification shall provide avenues of additional information, assisting customers in achieving requested conservation.

4.4.2 State II Actions – Up to 15 Percent Shortage

Prohibitions

- Stage II Actions would extend the voluntary requests under Stage 1 district-wide.
- Additionally, new meter sales for land development would be restricted, allowing meter sales only to property owners of presently existing parcels

Other Actions

- All customers would be notified of the shortage and would be asked to implement curtailments of use. Such notification shall provide avenues of additional information assisting customers in achieving requested conservation.
- Initiate media campaign to educate the District customers of conservation needs.

4.4.3 Stage III Actions – Up to 30 Percent Shortage

Prohibitions

- During Stage III, the voluntary action requests from Stages I and II become mandatory, as the District's Board of Directors, pursuant to section 350 of the water code, would declare a water emergency.
- Issuance of construction water meters would cease for the duration of the Stage III event, and meters would be installed for new accounts only where the building permit was issued prior to the declaration of the water shortage emergency.
- Mandatory use prohibitions would be enforced through water patrol personnel who may issue a warning notice for a first offense, provide for a water bill surcharge of $25 for a second offense, $75 for a third offense, and shut-off of water service for a fourth offense. For a fourth offense, normal water use initiation fees would apply for restoration of the service.

Other Actions

- In addition to the prohibited actions, the District would establish average monthly allotments for each connection based upon a base period selected by the District as follows:
  (1) Each single-family residential connection shall receive no more than 14 hundred cubic feet (hcf) per month, plus 20 percent of the average annual usage in excess of 240 hcf.
  (2) Each multi-family residential unit shall receive no more than 9 hcf per month, plus 40 percent of the average annual usage in excess of 145 hcf.
  (3) Each commercial, industrial and governmental connection shall receive no more than 80 percent of its average monthly usage.

(4) Each landscaping connection (dedicated irrigation meters) shall receive 40 percent of the average monthly usage, except those accounts determined by District staff to have met applicable landscape design criteria under city or county ordinance, which shall receive 80 percent of average monthly usage.
(5) Each recreational connection shall be allotted 70 percent of the average monthly usage.
(6) Accounts exceeding the usage rates are subject to 100 percent surcharge of the applicable rate for each use.

4.4.4 Stage IV Actions – Up to 40 Percent Shortage

Prohibitions

- All prohibitions from Stage III would be in effect.

Other Actions

- In addition to the prohibited actions, the District would establish average monthly allotments for each connection based upon a base period selected by the District as follows:
  (1) Each single-family residential connection shall receive no more than 14 hcf per month, plus 10 percent of the average annual usage in excess of 240 hcf.
  (2) Each multi-family residential unit shall receive no more than 9 hcf per month, plus 20 percent of the average annual usage in excess of 145 hcf.
  (3) Each commercial, industrial, and governmental connection shall receive no more than 70 percent of the average monthly usage.
  (4) Each landscaping connection (dedicated irrigation meters) shall receive 20 percent of the average monthly usage, except those accounts determined by District staff to have met applicable landscape design criteria under city and county ordinance, which shall receive 70 percent of average monthly usage.
  (5) Each recreational connection shall be allotted 50 percent of average monthly usage.
  (6) Accounts exceeding the usage rates are subject to 200 percent surcharge of the applicable rate for each use.

4.4.5 Stage V Actions – Up to 50 Percent Shortage

Prohibitions

- All prohibited actions in Stage IV would be in force, except as noted below.
- No meters would be installed for new accounts for the duration of the Stage V emergency.

Other Actions

- In addition to the prohibited actions, the District would establish average monthly allotments for each connection based upon a base period selected by the District as follows:
  (1) Each single-family residential connection shall receive no more than 10 hcf per month.
  (2) Each multi-family residential unit including mobile homes shall receive no more than 6 hcf per month.
  (3) Each commercial, industrial, and governmental connection shall receive no more than 65 percent of the average monthly usage.
  (4) Each landscaping connection (dedicated irrigation meters) shall receive no allotment, except those accounts determined by District staff to have met applicable landscape design criteria under city and county ordinance, which shall receive 15 percent of average monthly usage.
  (5) Each recreational connection shall receive no water. In the case of irrigation of golf courses, irrigation shall be limited to tees and greens only.
  (6) Exceeding the usage rates above are subject to 500 percent surcharge of the applicable rate for each use.

4.5 Allotment Appeals Procedures

(1) Any person who wishes to appeal their customer classification or allotment shall do so in writing using forms provided by the District.

(2) The Assistant General Manager will review appeals, and site visits will be scheduled if required.

(3) A condition of approval shall be that all applicable plumbing fixtures or irrigation systems be replaced or modified for maximum water conservation prior to considering an appeal.

(4) Appeals may be granted for the following conditions:

a. Proof of substantial medical requirements is provided.

b. Residential connections with more than four residents in a single-family household, or four residents at a multi-family household may be awarded an additional 2 hcf per person. During a Stage V shortage, a census will be conducted to determine the actual number of residents per dwelling unit. Water may be granted to additional permanent residents, defined as five days a week for nine months per year.

c. Commercial/Industrial accounts may appeal for increased allocations where it can be shown that allocations would otherwise cause unemployment, decreased production, or mechanical equipment damage, after confirmation by a District water auditor that the account has instituted all applicable water efficiency improvements.

d. Nonagricultural customers can appeal for additional water for livestock.

e. Government agencies (parks, schools, county government, etc.) may have their separate allotments for each meter combined into one “agency” allotment.

(5) In the event an appeal for additional allotment is requested for irrigation of trees or vegetation in residential categories or for any agricultural use, the District may use the services of a qualified consultant in determining the validity of the request.

(6) The District General Manager shall approve or deny appeals.

(7) If the District General Manager and the applicant are unable to reach accord, then the District Board of Directors, who will make the final determination, shall hear the appeal.

(8) All appeals shall be reported monthly to the Board of Directors.

4.6 Revenue and Expenditure Impacts

It is difficult to precisely gauge the revenue and expenditure impacts of implementation of the Water Shortage Contingency Plan. As the plan provides for both prohibitions, water use allotments, and penalty pricing for exceeding allotments, the ultimate revenue impacts will be based upon a mix of responses to these requirements. Additionally, weather can be a factor as well. Customers may find it more difficult to meet allocations during hot weather where a desire to maintain landscaping uses at a higher level exists, and therefore more customers may find themselves paying penalty rates.

For planning purposes, it is assumed that District conservation goals are met at each stage and that revenue losses are proportional to the commodity rate revenue not received, exclusive of penalty rates, plus revenue losses due to particular prohibitions. It is also assumed that additional District expenses for implementing the plan would be offset by excess use penalties.

Table 4-2 demonstrates estimated potential revenue losses in 2008 in water and wastewater operating revenue. Total estimated average operating revenue is $14,100,000.

Table 4-2. Annual potential revenue losses by plan stage [1]

	Stage I 5%	Stage II 15%	Stage III 30%	Stage IV 40%	Stage V 50%
Water Sales losses	$713,751	2,141,255	4,282,511	5,710,014	$7,137,519
Less production costs reduction	(129,720)	(389,160)	(778,382)	(1,037,760)	(1,297,200)
Net revenue reduction	584,031	1,752,095	3,504129	4,672,254	5,840,319
Percent total water and wastewater revenue loss	4%	12%	25%	33%	41%

[1] Estimated water and wastewater service revenue at 2008 of $14.1 million, marginal water commodity charge of $660/af and production cost savings from water and wastewater systems of $120/af (Water Conservation Feasibility Study, 2003).

4.7 Measures to Overcome Impacts

Based upon the District's current fiscal situation, impacts during Stages I and II could be absorbed by District reserves without requiring a rate increase, provided the shortage condition did not persist for more than two years. Impacts beyond two years would need to be reassessed.

Stages III and beyond could require reductions in the pay-as-you-go portion of the District's Capital Improvement Program. Additionally, deferring non-critical maintenance items and filling some personnel vacancies would be considered. Should revenue loss impacts begin to affect essential District operations, a temporary emergency surcharge on the base water rate could be imposed to fund District operations.

4.8 Reduction Measuring Mechanisms

As the District's accounts are fully metered, accounting for actual consumption will be afforded for each customer against any allocation. Well production records and imported water purchases will also be tallied to discern overall production amounts versus conservation goals. Collectively, these data will be analyzed to assess any need for alterations to the Water Shortage Contingency Plan.

Yucaipa Valley Water District
2005 Urban Water Management Plan and
Water Shortage Contingency Plan

Section 5. References

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Yucaipa Valley Water District (January 2003).*Urban Water Conservation and Feasibility Plan Draft Report*.

Yucaipa Valley Water District (January 2002). *Water Master Plan*

Attachment A. Urban Water Conservation Feasibility Study

YUCAIPA VALLEY WATER DISTRICT

Urban Water Conservation Feasibility Study And Implementation Plan

DRAFT REPORT

JANUARY 2003

WATER 3 ENGINEERING, INC.
WATER • WASTEWATER • RECYCLED WATER

In Association With:

A & N Technical Services, Inc.

WATER 3 ENGINEERING, INC.
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January 28, 2003

Mr. Joseph B. Zoba
General Manager
YUCAIPA VALLEY WATER DISTRICT
12770 Second Street
P.O. Box 730
Yucaipa, CA 92399-0730

Subject: **Urban Water Conservation Feasibility Study and Implementation Plan Draft Report**

Dear Mr. Zoba:

Enclosed are five copies of the above referenced draft report for your review and comment. We will finalize the report after we receive your comments so that we can forward to DWR per the requirements of the contract. We would particularly like you to provide feedback on Section 9-Implementation Plan that includes a five year budget. We would be happy to meet at your convenience to discuss District comments or to answer any questions you may have.

Sincerely,

WATER 3 ENGINEERING, INC.

Scott Goldman
Principal

Cc: Tom Chesnutt, A&N Technical Services
Dave Pekelney, A&N Technical Services

YUCAIPA VALLEY WATER DISTRICT
URBAN WATER CONSERVATION FEASIBILITY STUDY AND IMPLEMENTATION PLAN

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YUCAIPA VALLEY WATER DISTRICT
URBAN WATER CONSERVATION FEASIBILITY STUDY AND IMPLEMENTATION PLAN

SECTION 1
INTRODUCTION

1.1 BACKGROUND

The Yucaipa Valley Water District (District) is a self-governing special district organized under laws of the State of California to provide:

- Water Supply, Treatment, and Distribution;
- Recycled Water Supply and Distribution Services, and
- Wastewater Collection and Treatment.

The District was formed in 1971, acquiring many of the private water companies serving the Yucaipa Valley. The District provides water to much of the Yucaipa Valley including most of the City of Yucaipa, a portion of the City of Calimesa, and unincorporated areas in San Bernardino and Riverside Counties. A vicinity map locating the District is shown on **Figure 1-1.**

The region is undergoing change from a semi-rural and agricultural land use to predominantly suburban residential and commercial land use. The population within the District's sphere of influence is expected to grow from its current level of about 50,000 to about 82,000 by 2020. Water demands are expected to almost double from 14,500 acre-feet per year (afy) to about 28,000 afy. A well designed conservation program is anticipated to reduce these demands by 10 percent or more.

The District currently satisfies the majority of the service area water demands from groundwater supplied through District-owned wells located throughout the Service Area. An extensive distribution system provides water storage and transmission throughout the District's 18 pressure zones. The only supply of surface water is provided through

the existing Oak Glen Water Filtration Plant (WFP). Additional water sources that are expected to be available to the District in the near future include imported water through the State Water Project (SWP) and recycled water from the District-owned Wastewater Treatment Plant (WWTP). Use of SWP as a potable water source will require construction of a new Yucaipa Valley Regional Water Filtration Facility (WFF) that is currently scheduled to be complete in 2006.

1.2 PURPOSE

The purpose of this Urban Water Conservation Feasibility Study and Implementation Plan is to:

1. Develop the most feasible urban water conservation program for the District
2. Determine projected conservation program effects on District demands
3. Develop information necessary to make application for an Urban Water Conservation capital outlay loan
4. Develop an implementation plan to execute the preferred program alternatives

The District is committed to an integrated and aggressive water conservation program as a complement to its overall water management program including water recycling.

1.3 SCOPE

The scope of the effort to update the Water Master Plan is broken down into the following major task:

- Review background information, including the 2000 Urban Water Management Plan Demand Management Analysis.
- Assess potential alternative water supply costs.
- Develop current wastewater treatment and disposal costs.
- Assess current customer database information.
- Identify major irrigation accounts and pre-1992 housing and commercial units.
- Develop refined BMP and Potential BMP element design and costs.
- Identify a preferred conservation program based on analysis.

- Develop an implementation plan for the preferred conservation program over the next five years.

1.4 RELEVANT STUDIES

Several previous studies have been prepared for the District providing water projections, planning criteria and analysis of issues impacting the District's water service area were used in the development of this Urban Water Conservation Feasibility Study. A brief description of some of the more relevant studies and study conclusions is provided in the following sections.

1.4.1 YVWD Urban Water Management Plan and Water Shortage Contingency Plan (2000)

In December 2000 *the Urban Water Management Plan and Water Shortage Contingency Plan* was completed to meet the requirements of the California Urban Water Management Planning Act. The Plan includes results of water supply reliability analysis and water demand management measures. Recycled water use optimization and a water shortage contingency plan are presented. Despite rapidly growing water demands in the Yucaipa Valley Water District, ample opportunities exist to provide a reliable water supply for the community through ultimate buildout. The District will continue to use groundwater while introducing State Water Project water to meet local water demands.

1.4.2 Draft Water Master Plan for the Yucaipa Valley Water District (2002)

The draft Water Master Plan was an update to the 1994 Water Facilities Master Plan. The draft Master Plan identified the facilities necessary for the District to utilize SWP water expected to become available in 2003. These facilities included a new Regional Water Filtration Facility and several miles of new water transmission pipelines. The new WFF was identified with an initial capacity of 12 mgd and an ultimate capacity of 36

mgd. The SWP water will be received at a higher elevation than the majority of groundwater is currently pumped. The approach developed to satisfy water demands included an analysis of using water supplies in an energy efficient manner.

Additional water system improvements were recommended to eliminate identified system deficiencies. This included the need for additional operational storage and associated pumping facilities. A storage shortfall of 21.5 million gallons (mg) was identified by 2010 and another 5 mg shortfall by 2020. Five existing pump stations required rehabilitation and five new booster pump stations were identified to serve the needs of new development.

1.4.3 Draft Non-Potable Water Master Plan (2002)

The 2002 Water Master Plan included an analysis of the potential uses and benefits of using untreated SWP water and recycled water from the District's wastewater treatment facility. This effort was an update to an earlier prepared Reclamation Master Plan that was completed in November 1992. The Plan identified recycled water use sites both within the District's sphere of influence and potential export of recycled water to neighboring agencies.

A market assessment investigated the potential existing and future users within four major areas: Yucaipa Valley Water District, City of Redlands and Eastern Municipal Water District. For the Yucaipa area, the uses identified include landscape irrigation of golf courses, parks, schools and street medians. Eastern Municipal Water District (EMWD) has a water reclamation system that includes irrigation, groundwater recharge via surface spreading, and wetlands treatment and is short of supply in the summer months. The potential for non-potable water was estimated at 6,400 afy for the Yucaipa service area including the Oak Valley development, with additional recycled water being provided to EMWD.

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SECTION 2
SERVICE AREA BACKGROUND

2.1 INTRODUCTION

The District's sphere of influence encompasses both water and wastewater service areas. Water service within the District's sphere of influence is provided by the Yucaipa Valley Water District (YVWD), as well as the South Mesa Mutual Water Company (SMMWC) and the Western Heights Mutual Water Company (WHMWC). This section presents the water supply and demand considerations that affect the development of the preferred water conservation program. In this regard it was important to consider the impacts and water use of the two Mutual Water Companies. However, the analysis and water conservation program was developed only for YVWD. Information contained in this section of the report is primarily derived from the draft 2002 Yucaipa Valley Water District Water Master Plan.

2.2 WATER SUPPLY

The following is a discussion of the water supply sources available to the District to meet the anticipated average annual and maximum day water demands.

2.2.1 Groundwater

Groundwater was originally developed in the region to serve a predominantly agricultural base of orchard crops. In recent years agriculture is giving way to urban and suburban development. The Yucaipa Basin is divided into a series of small subbasins separated by faults and other physical barriers. These subbasins include the Oak Glen, Wilson Creek, Gateway, Calimesa, Western Heights, Triple Falls Creek and

Crafton subbasins. Numerous studies have been done over the years to identify the perennial yield of the Yucaipa Groundwater Basin. This is difficult due to the unique physical characteristics and availability of hydrologic data. It is generally accepted that the working perennial yield of the Yucaipa Basin is about 9,000 afy. This coupled with the rights to about 1,000 afy from the Beaumont Basin results in a total of approximately 10,000 afy of groundwater available to the water agencies in the District's sphere of influence.

The District currently has thirty-four active and standby groundwater wells available for use. Due to the age and poor condition of some of these well facilities, only 20 of the active wells are anticipated to remain in service through 2010. The firm pumping capacity projected for 2010 is approximately 13,800 gallons per minute (gpm), or about 19.8 mgd. The firm pumping capacity is based on only those wells that are considered reliable and significant producers of groundwater. The District reserves about 15 percent of the firm capacity could be unavailable during the maximum day demand due to maintenance or unplanned outages. This reduces the District's available well capacity to 11,700 gpm or 16.8 mgd.

2.2.2 Local Surface Water

In 1996 the District constructed the Oak Glen Filtration Plant to treat surface water collected in the Oak Glen watershed. The design capacity of the plant is 550 gallons per minute (0.8 mgd), however, treated flows are typically limited by declining surface water availability that has reached flows as low as 250 gpm (0.4 mgd). The annual production from the Oak Glen Filtration Plant varies between 600 and 800 afy. The Filtration Plant receives water primarily from a tunnel system that flow into a raw water pipeline. The tunnels are located approximately 30 to 50 feet underground, with many portions structurally failed or unstable. As development in the area continues, the influence of human activity can have negative impacts on the quality of the water collected in the region and the annual production may decrease.

Though the Santa Ana – Mill Creek Cooperative Water Project Agreement, the District is permitted to exchange up to 32 cfs (20.7 mgd) of State Water Project water for Mill Creek water when available. This water can be delivered by gravity to the Wilson Creek spreading grounds or to the planned Regional Water Filtration Plant. This source is highly variable, however, depending upon local hydrology. Flows in the creek can range from 10,000-120,000 acre-feet per year with the bulk of high water flows in the winter months. This is the least expensive supplemental surface water supply for the District. However, lack of storage limits the ability to exchange this water often available in wet years, for water during dry years.

In addition to the Mill Creek supplies, the District will be able to receive exchange water from Santa Ana River water right holders once the Regional Water Filtration Facility is completed and connected to the State Water Project East Branch extension pipeline in 2006.

2.2.3 Imported Surface Water

The San Bernardino Valley Municipal Water District encompasses much of the YVWD and holds an entitlement to SWP water in the amount of 102,600 acre-feet annually. The San Gorgonio Pass Water Agency serves the remainder of YVWD through its SWP entitlement of 17,300 acre-feet per year. SWP water is available to the District directly or by exchange through the East Branch extension pipeline, which was completed in 2003. This water is available for groundwater recharge and non-potable use until the Yucaipa Valley Regional Water Filtration Facility is constructed.

SWP reliability has been negatively affected due to the State's inability to complete the project as contracted. Despite efforts, it is likely that the full 4.2 million acre-feet per year design delivery capacity will never be reached due to environmental limitations. Currently the maximum delivery capability for the project is somewhat less than 3.5

million acre-feet. In most years this amount cannot be delivered due to infrastructure limitations and environmental restrictions.

2.2.4 Water Recycling

The District is developing facilities to use non-potable water to meet a portion of the water demands of the region. The objective of the system is to supplement the local potable supply in the most cost effective and efficient manner possible. The District will realize several benefits by implementing its non-potable water distribution system, including:

- Preserve groundwater supplies for potable use during periods of drought.
- Reduce groundwater overdraft conditions that exist in the Yucaipa Valley.
- Reduce energy consumption by using the elevation available from the State Water Project system to serve upper zones rather than pumping groundwater from lower elevations.
- Provides District with greater control of major irrigation customers during conditions of extended drought.

Recycled water meeting Title 22 requirements for unrestricted reuse is available from the Henry N. Wochholz Wastewater Treatment Facility (WWTP). The existing WWTP has a rated capacity of 4.5 mgd and is undergoing an expansion and upgrade to a capacity of 8 mgd. The potential exists for the District to increase the amount of water that is beneficially reused within the service area from the existing WWTP. Additional environmental analysis on the potential impacts to San Timoteo Creek and surrounding areas is required before this can occur.

A new Water Reclamation Plant (WRP) is planned to serve the Oak Valley development. This WRP will provide both wastewater treatment as well as a source of recycled water for the Oak Valley area. The Yucaipa Wastewater Master Plan identifies the capacity of the new WRP at 4 mgd, required to serve the needs of Oak Valley as well as other areas of the District from where wastewater could flow by gravity to the

new WRP. Based on the projected capacities contained in the Yucaipa Wastewater Master Plan and considering both treatment plants, there is the potential to recycle over 11 mgd of wastewater.

2.3 POPULATION GROWTH AND WATER DEMAND

To estimate the future rate and amount of growth in the area, the District relies on the projections developed by the Cities of Yucaipa and Calimesa, along with information obtained from individual developers. The 2000 census identified the City of Calimesa population to be 7,139 and City of Yucaipa population to be 41,207.

The large master planned community of Oak Valley is proposed for development to the south of Calimesa. The total buildout population for Oak Valley is estimated at 37,500. Based on land use plans provided by the developer only an estimated 61 percent of the development lies within the YVWD Sphere of Influence. This results in an estimated buildout population for the District of about 22,900 residents within Oak Valley.

2.3.1 Historical Population Base and Recent Growth

The Cities of Yucaipa and Calimesa provided population projections for the years 2020, 2030, 2040 and 2050. It is assumed that these projections include the portions of unincorporated County areas that lie in the District's sphere of influence. Projections for the Oak Valley area were provided by the developer and indicated that they anticipate their first occupancies will occur in 2005, with a 20-year build-out schedule to the ultimate population. These population projections are summarized in **Table 2-1** and form the basis for the water demand projections.

Table 2-1
Population Projections

Year	Yucaipa	Calimesa	Oak Valley (3)	Total
2000	41,207 (1)	7,139 (1)	0	48,346
2005	44,900 (2)	8,100 (2)	500	53,500
2010	48,500	9,000	5,600 (2)	63,100
2020	57,100	9,000	15,800	81,900
2030	62,900	9,000	22,900	94,800
2040	67,400	9,000	22,900	99,300
2050	69,700	9,000	22,900	101,600

(1) Based on 2000 Census
(2) Straight-line estimate used since population projection not provided for the listed year.
(3) Includes 61 percent of Oak Valley that is assumed to be within YVWD Service Area

These population projections include the area currently services by the two mutual water companies that exist within the YVWD sphere of influence.

2.3.2 Historic and Projected Water Demand

Table 2-2 shows the historic water use for recent years for YVWD only (excluding the mutual water companies). Future projections are based on recent years per capita consumption and the population projections included in **Table 2-1**. Growth projections are driven to a large extent on the expecting build out within the local communities.

Table 2-2
Annual Water Use (HCF)

Year	Water Use (afy)	Overall Per Capita Consumption (gpcd)
Year 1997 [1]	8,385	260
Year 1998 [1]	7,865	238
Year 1999 [1]	9,513	275
Year 2000 [1]	10,161	282
Year 2020	19,562	280 [2]
Year 2050	25,244	280 [2]
Notes: (1) Historical Water Use. (2) Projected per capita rate.		
Source: Water Master Plan		

2.3.3 Current Number of Accounts and Water Demand

A disaggregated tabulation of the number of accounts and water use was conducted using data from the YVWD billing system. Cross tabulation of the most recent full year (2001) of billing system data shows that the majority of accounts are residential (**Table 2-3**). Single family is the largest category. The 309 multi-family accounts cover a total of 2,561 units (not shown in **Table 2-3**).

Table 2-3
Number of Customer Accounts

Customer Type	2001	Percent
Commercial	143	1.78%
Construction	39	0.49%
Fire	33	0.41%
Industrial	16	0.20%
Institutional	35	0.44%
Irrigation	41	0.51%
LOAD	2	0.02%
Multi-Family	309	3.86%
REC	2	0.02%
Single Family	7,391	92.25%
Vacant	1	0.01%
Total	8,012	100.00%

Source: 2001 figures compiled from billing records.

Table 2-4 shows the annual water use, also tabulated from the billing system for 2001. The table shows the wide range in water use per account, depending on account type. For example, irrigation use is 4.6 percent of total even though irrigation accounts are less than one percent of the total number of accounts. In contrast, single family residential water consumption is 79.4 percent of total for the 92.3 percent of accounts.

Table 2-4
Annual Water Use (HCF)

Customer Type	2001	Percent
Commercial	103,474	2.99%
Construction	36,528	1.06%
Fire	279	0.01%
Industrial	56,574	1.64%
Institutional	56,678	1.64%
Irrigation	160,440	4.64%
LOAD	399	0.01%
Multi-Family	292,106	8.45%
REC	5,577	0.16%
Single Family	2,743,736	79.40%
Vacant	7	0.00%
Grand Total	3,455,798	100.00%
Source: 2001 figures compiled from billing records.		

2.4 CONCLUSIONS

Yucaipa Valley Water District is facing rapid change in its population base and limited local developed supply. The District is responding by pursuing water imports, water recycling and improved groundwater management. Conservation is being planned as an important part of the overall strategy to deliver reliable high quality water to the service area.

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SECTION 3
CONSERVATION POLICY AND ECONOMICS

3.1 INTRODUCTION

This section describes the environmental policy drivers motivating conservation programs throughout California. The Memorandum Of Understanding Regarding Urban Water Conservation and the CalFed Bay-Delta Process are two of the most important policy processes relevant to YVWD. The economic conditions that affect conservation and its importance are also described, including rapid population and economic growth, combined with a relatively untapped conservation potential. The hydrologic drivers are reviewed briefly; as describe in Chapter 2, groundwater basin overdraft and small variable local surface water supplies present urgent challenges for the local hydrologic region.

3.2 ENVIRONMENTAL POLICY DRIVERS

3.2.1 The Memorandum Of Understanding

The Memorandum of Understanding Regarding Urban Water Conservation ("the MOU") is an agreement among many of California's urban water agencies to implement water conservation measures. The conservation measures in the agreement are organized as a series of Best Management Practices (BMPs) as described in Exhibit 1 of the MOU. Signatory agencies agree to fulfill the BMPs within timetables that are specific to each BMP, to the extent the BMPs are cost-effective. The MOU was first adopted December 11, 1991, and was last amended March 14, 2001.

The California Urban Water Conservation Council (CUWCC) is the organization charged with implementing the MOU, including tracking the level of fulfillment of the BMPs, amending the BMPs, developing new BMPs, defining cost-effectiveness for MOU purposes, and generally participating in conservation policy development. CUWCC has a number of committees comprised of members of the three signatory groups, which include:

- Water suppliers (Group 1)
- Public advocacy organizations (Group 2)
- Other interested groups such as consultants and vendors (Group 3)

CUWCC has developed a number of documents and services to support its signatories in their efforts to fulfill the MOU. Suppliers can report their progress to CUWCC via their internet web site (cuwcc.org). The *Cost-Effectiveness Guidelines* document defines in practical terms how to calculate cost-effectiveness for the purpose of BMP exemption. The *Cost and Savings* document provides a starting point for finding data on the costs and savings of the BMPs.

3.2.2 The BMPs and PBMPs

The MOU contains a list of best management practices for urban water conservation that are to fulfill, as long as they are cost-effective. **Table 3-1** contains the list of BMPs and that that were recommended for YVWD in the 2000 Urban Water Management Plan.

Table 3-1 Best Management Practices (BMPs)	
1.	Residential surveys
2.	Residential plumbing retrofit
3.	System audits and leak detection
4.	Metering
5.	Large landscape
6.	High efficiency washer rebates
7.	Public Information Programs
8.	School Education Programs
9.	Commercial, Industrial, Institutional
10.	Wholesale agency assistance
11.	Conservation pricing
12.	Conservation coordinator
13.	Water waste prohibition
14.	Residential ULFT Replacement
	Recommended in UWMP

3.2.3 CalFed Process

"The mission of the CALFED Bay-Delta Program is to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta System." The CALFED process is comprised by multi-agency participation at the state and federal levels. Since YVWD will soon have the infrastructure to serve SWP water within its service area, it will be connected to the issues of the CALFED process and Bay Delta ecosystem. Water conservation savings will have the effect of improving the ability to manage water resources locally and in other parts of the State.

3.2.4 State Funding Mechanisms

As a matter of policy, funding mechanisms at least at the State level have increasingly utilized conservation activities as funding criteria. Loans are easier to apply for if an agency is a MOU signatory.

3.3 ECONOMIC DRIVERS

3.3.1 Rapid Demand Growth

Population is expected to grow rapidly over the next 20 years. New developments will be complete with irrigated landscapes and golf courses requiring consider demand for water resources. These changes represent not only an increase in population, but an increase in water-consuming activities such as landscape and golf courses.

Using the total Year 2000 Census population of approximately 48,500 and an estimate of 23,000 Equivalent Dwelling Units (EDUs) within the District's sphere of influent results in about 2.1 persons per EDU. This EDU value is lower than typically expected, probably due to a higher percentage of retirement type housing, but is anticipated to increase to about 2.5 persons per EDU in the future as the area shifts toward more typical family oriented housing. Based on the total area population and water use the per capita water consumption is estimated to be roughly 280 gallons per person per day (gpcd).

3.3.2 Large Capital Investments

YVWD is making large investments in water treatment, recycling, and distribution infrastructure. To the extent that conservation can reduce the expected demand load, new investments can be tailored to take advantage of potential cost savings in terms of design capacity or operating and maintenance costs.

A Capital Improvement Program (CIP) was developed for the District as part of the Water Master Plan to accommodate the facility upgrades and system enhancements that were identified. The proposed CIP was divided into four phases over the next twenty years.

A major expenditure over the next five years is required for design and construction of the new Regional Water Filtration Facility. Other major expenditures include potable water transmission mains to convey water from the new filtration facility, potable water storage reservoirs, and the non-potable water system. Additional identified projects are needed to improve the existing system to continue to provide adequate service to the existing customers in the water service area. Required capital expenditures identified in the Water Master Plan are summarized by phase as follows:

Phase	Years	CIP Funding Required
I	2003 thru 2007	$ 81 million
II	2008 thru 2012	$37.2 million
III	2013 thru 2017	$ 12.4 million
IV	2018 thru 2022	$ 4.7 million

Water conservation offers the District with the potential for significant savings considering the major expenditures required over the next few years

3.3.3 Cost-Effectiveness

Conservation measures that are cost effective from the YVWD perspective are an important means of meeting growing demand in the style of integrated resources planning and cost minimization.

3.4 HYDROLOGIC DRIVERS

The needs for water supply augmentation and conservation are great given the current hydrologic conditions in the local region. The Yucaipa groundwater basin upon which UVWD currently relies primarily is in a technical state of overdraft with about 15,000 af being pumped each year and an estimated perennial yield of about 9,000 af. Coordination among the several water suppliers who pump from the basin will be essential in the years to come if the quality and supply of groundwater is to be well managed.

Small and Variable Surface Supply. Local surface water supplies are relatively small and less reliable than other sources. As discussed in Section 2 these include water from the Oak Glen watershed, Mill Creek water and Santa Ana River water. These supplies are highly weather dependent and primarily available during the winter months. There are increasing water quality concerns with the Oak Glen watershed due to continued development in the area. The Santa Ana River water is only available to the District as an exchange of SWP water.

The most reliable supply of local water is recycled water from the District's WWTP. Environmental issues may limit this supply due to habitat that has been established in San Timoteo Creek downstream of the discharge location. The District is currently preparing studies to determine the amount of recycled water that be diverted from San Timoteo Creek and can be beneficially reuse within the YVWD service area.

3.5 CONCLUSIONS

Conservation is important from a number of perspectives, including water resources policy, regional demand economics and cost effectiveness, and hydrologic.

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SECTION 4
BMP COVERAGE REQUIREMENTS

4.1 INTRODUCTION

This chapter includes an analysis of the MOU and its implications for YVWD Best Management Practices (BMP) implementation. For each of the BMPs, we review the basic elements of the BMP requirements, then quantify the BMP for the YVWD service area. This chapter is not meant to be the definitive or fully comprehensive in all aspects of the MOU, but rather it focuses on the quantifiable aspects that will be of most immediate interest to YVWD. For example, the chapter concerns the coverage requirements of the MOU that directly affect water savings, but it does not cover procedural requirements, including reporting.

To standardize the methods of accounting used to determine BMP coverage, CUWCC has developed a "Coverage Calculator" spreadsheet (version 1.65 is the latest at the time of this writing). We report in this chapter the results of using the Coverage Calculator as applied to YVWD. Note that the Coverage Calculator is designed for reconnaissance-level planning purposes. It does not account for BMP exemptions, where, in practice, some agencies may seek exemption from some BMPs based on cost-effectiveness or funding adequacy. The spreadsheet also does not account for past achieved conservation and, thus, it does not calculate the additional conservation still needed. We conduct this part of the analysis outside the calculator as described below.

BMP Coverage is calculated in the model for BMPs 1, 2, 4, 5, 9, and 14:

- BMP 1: Residential Water Surveys
- BMP 2: Residential Plumbing Retrofits
- BMP 4: Metering
- BMP 5: Large Landscape
- BMP 9 Commercial, Industrial, Institutional (Proposed Revision 1/10/2001)
- BMP 14 Residential ULFT Replacements

The model is designed only to quantify the BMP coverage only for those BMPs which can be tangibly and readily quantified. The following BMP is included in the analysis, but is not with the Coverage Calculator:

- BMP 6—High Efficiency Washing Machines

The following BMPs are not included in this analysis:

- BMP 3—Water Audits and Leak Detection
- BMP 7—Public Information Programs
- BMP 8—School Education Programs
- BMP 10—Wholesale Agency Assistance
- BMP 12—Conservation Coordinator
- BMP 13—Water Waste Prohibition

The BMPs not included in the CUWCC model can be included in the Conservation Planning Model (introduced in the next chapter) to the extent activities or devices can be counted and savings estimated. Indeed, the purpose of this chapter is to determine in the narrow literal sense what the BMPs mean, as a point of departure. The later chapters in this document develop a broader conservation plan that is tailored to the circumstances of YVWD.

This analysis assumes that YVWD will sign the MOU sometime in 2003. Thus, implementation dates referred to in the BMPs will all be calculated relative to 2004, the first Implementation Year.

4.2 BMP 1 – RESIDENTIAL SURVEYS

BMP 1 concerns water efficiency surveys in residential settings. The BMP requires that at least 15 percent of single family and 15 percent of multi-family residential accounts receive surveys within 10 years, starting in the Implementation Year (the year after signing the MOU). The 15 percent goal is considered on track if, for each two-year reporting period: (1) intermediate percentage goals are met and (2) at least 20 percent of single family and multi-family accounts are contacted regarding surveys.

Suppliers get credit for surveys conducted prior to signing the MOU according to a gradual schedule ranging from 1990 to 1997, depending on when the surveys were conducted. Since YVWD has not had a residential survey program previously, and since surveys have not otherwise been conducted in the service area, calculations to determine credit for past surveys are not necessary.

Based on current billing information, there are an estimated total of 9,400 water accounts in YVWD. Using the detailed billing data described in Chapter 2 (Year 2001--the latest full year of data available), with the number of accounts by sector, we proportionally increase the number of residential accounts to match the current total for both single family accounts and multi-family units. Thus, we estimate there are currently 8,671 single family accounts and 3,005 multi-family units in the service area.

Table 4-1 shows the intermediate milestones that are specified in the BMP:

Table 4-1
Residential Surveys

By Year	Cumulative Single Family Units Surveyed	Cumulative Multi Family Units Surveyed
2006	130	45
2008	312	108
2010	546	189
2012	832	288
2014	1,009	349
2014 (15% Goal)*	1,171	406

*Calculations conducted with CUWCC BMP Calculator 1.65. Note CUWCC staff interprets the ambiguity in the BMP language to mean that both the last intermediate milestone and the ultimate goal to land in the same year (2014 in this case).

4.3 BMP 2 – RESIDENTIAL PLUMBING RETROFITS

BMP 2 coverage refers to low-flow showerheads in residential settings. The BMP requires one of three options: (1) that low-flow showerheads be distributed to at least 10 percent of single family residences and 10 percent of multi-family units each two-year reporting period; (2) that at least a 75 percent device saturation rate be demonstrated; or (3) enact an ordinance to replace high-flow with low-flow devices.[1]

It is estimated that in 1991 there were 6,634 single family residences and 2,299 multi-family units in the YVWD territory. This estimate is based on the previously described tabulation of Year 2001 billing records times the ratio of 1991 to 2001 number of meters (in lieu of historical records of multi-family units). Thus, for each two-year reporting period, the 10 percent goals are 663 and 230 for single family and multi-family respectively.

[1]The BMP language is ambiguous in several ways: (1) regarding whether the 10 percent and 75 percent figures are in reference to pre-1992 fixture stock or the current fixture stock and (2) whether the

Device saturation rate may be determined by previous active conservation programs or simply due to natural replacement in the presence of plumbing code. For example, with a natural replacement rate of 4 percent per year,[2] 39 percent of the pre 1991 stock would be retrofitted by 2003 (12 years). Thus, without significant active conservation, we would not expect to be near 75 percent saturation when considering the pre-plumbing-code housing stock. The BMP language can be interpreted to refer to 75 percent of pre-1992 housing, or 75 percent of current housing. Due to plumbing code, all showerheads installed since then have been low flow fixtures, and since there has been significant growth, the "current housing" interpretation would result in a greater saturation figure--53 percent current saturation.

In summary, with these assumptions, YVWD would have three options to fulfill the BMP: 1) to distribute showerheads to at the specified rate; 2) to otherwise complete the installation of 22 percent additional saturation to meet the 75 percent saturation criterion, or 3) to implement a retrofit ordinance.

4.4 BMP 4 – METERING

Since there are no unmetered accounts in YVWD, this BMP is fulfilled and no further actions are needed.

4.5 BMP 5 – LARGE LANDSCAPE

BMP 5 concerns large landscape conservation, including sites such as parks, schools, golf courses, and other commercial, industrial, and institutional (CII) customers. For those sites with dedicated-use water meters, the BMP calls for implementing a water budget—of not more than 100 percent of ETo—for at least 90 percent of the sites by the second reporting period after commencing the BMP. Since the BMP specifies that

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percentages refer to households with at least one retrofit, or to the entire stock of devices. BMP 2 percentage requirements are based on pre-1992 stock in the CUWCC calculator.

it is to commence no more than 2 years after signing the MOU and since reporting periods are 2 years each, the budgets should be in place by 2009 if YVWD signs the MOU in 2003.

For those CII customers with mixed-use meters, 20 percent of the account should get survey offers each two-year reporting period with a goal of completing surveys at 15 percent of sites within 10 years. Survey offers should begin by 2007, one reporting period after the BMP is to commence.

Current estimates indicate that there are 76 large landscape accounts with dedicated-use meters.[3] None of the dedicated accounts have water budgets assigned by YVWD. Thus, 68 water budgets should be in place by 2009 according to the BMP. Note that roughly half of the accounts are currently irrigated with up-to-date equipment and schedules. Further, approximately 20 percent of the dedicated meters will be converted to recycled water use in the next few years, and a total of approximately 1/3 will be converted within five years, according to existing plans. BMP 5 does not mention how to account for landscape irrigation with recycled water. Although recycled water can save large quantities of fresh water, there is not a provision in BMP 5 to give an agency credit toward meeting BMP 5.

Current estimates indicate that there are 176 CII accounts with mixed-use meters serving (in part) landscape irrigation. Thus, 35 survey offers should be provided each two-year reporting period and after 10 years, 26 surveys should be completed.

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[2] Commonly used figures for natural replacement range between 2 and 4 percent per year.

[3] The number of account in the Base Year is the number the BMP specifies should be used to determine the number of budgets. The Base Year for YVWD will be the year it signs the MOU.

Table 4-2
Large Landscape Schedule

By Year	Dedicated-Use Meter Budgets	Mixed-Use Meter Surveys Completed
2007		3
2009	68	6
2011		11
2013		17
2015		24
2015 (15% Goal)*	68	26

*Calculations conducted with CUWCC BMP Calculator 1.65. Note CUWCC staff interprets the ambiguity in the BMP language to mean that both the last intermediate milestone and the ultimate goal to land in the same year (2015 in this case).

4.6 BMP 6 – HIGH EFFICIENCY WASHING MACHINES

BMP 6 concerns incentives for installing high efficiency washing machines. The BMP calls for the implementation of a financial incentive for customers at a level that is cost-effective considering the benefits of water savings. The incentive is only required if local energy providers offer an incentive program as well, and only if the cost effective incentive is $50 or more. Thus, the BMP calls for water suppliers to complement existing washer incentive programs, but it does not require the development of a program in isolation.

The BMP provides a default assumption of water savings equal to 5,100 gallons per year, or .016 AF/yr equivalently. With a service life of 10 years and avoided costs equal to $352/AF (see Chapter 5), the benefit in undiscounted dollar terms is $56 (= .016 * 10 *$352). Since this value is close to the $50 cutoff, additional examination of the assumptions may be a worthwhile: water savings, service life, and avoided costs of water. However, the results as described herein indicate YVWD should provide a $56

incentive for high efficiency washers, starting in 2005—two years after the assumed MOU sign date of 2003.

4.7 BMP 9 – COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL ACCOUNTS

BMP 9 concerns water conservation at commercial, industrial, and institutional (CII) accounts; examples include the following (summarized from BMP 9):

- Commercial: Hotels, restaurants, office buildings, commercial business, or other places of commerce.
- Industrial: Manufacturers or processors of materials
- Institutional: Schools, courts, churches, hospitals, or government facilities.

The primary requirements of BMP 9 include identifying and ranking by water use CII accounts, and a combination of surveys, incentives, and performance targets. Water consuming devices in the CII sector of YVWD are primarily plumbing fixtures and landscape irrigation at commercial and institutional sites. There is no manufacturing in the service area on a significant scale. Since commercial landscapes are covered under BMP 5, the most significant areas of concern for BMP 9 for YVWD are toilets, sinks, and dish washers at CII locations.[4]

Note that since YVWD would be signing the MOU after July 1, 2001, it is not subject to the BMP 9 Interim CII ULFT Replacement Program. In sum, most of the water savings actions uniquely and strictly required in BMP 9 (i.e., does not overlap with other BMPs) would be derived from commercial sinks and dish washers; CII water surveys is not likely to be the most efficient way to reach these areas of conservation potential.

Nonetheless, for the purposes of water planning aside from the goal of MOU fulfillment, this section calculates the requirements of BMP 9's Interim ULFT Replacement

[4] BMP 9 water savings objectives do include savings from other BMPs, such as landscape savings under BMP 5. However, since this chapter is focusing on an action plan for YVWD, we focus on the action items in BMP 9 that are not covered in other BMPs determined with the Coverage Calculator.

Program for the YVWD service area, as an effort to fulfill the spirit (if not the letter) of the MOU. ULFT savings potential calculations first start with an estimation of the number of toilets in the service area. CUWCC has developed a database the can be used to determine the number of toilets that were installed prior to 1992 based on zip code.[5] Using 100 percent of zip codes 92399 and 92320, **Table 4-3** shows the estimated pre 1992 toilet inventory for YVWD, pre-code for 1.6gpf ULFTs.

Table 4-3
CII Toilet Inventory (Pre-1992)

Sector	Toilets
Hotels	264
Eating	867
Health	116
Offices	403
Retail/ Wholesale	193
Other	90
Industrial	272
Churches	97
Government	50
Schools: K to 12	35
Coverage Total	2,387

Source: Data from CUWCC draft toilet census database.

Exhibit 8 of the MOU contains the method of calculating the 10-year savings potential from the inventory of CII toilets. The Interim ULF Toilet Requirements in BMP 9 call for achieving 3 percent of the 10 year potential over the 3-year interim period. **Table 4-4** shows the 10-year savings potential for each of the economic sectors according to the method in Exhibit 8 as implemented in the BMP Calculator. Again, the BMP does not ask YVWD to achieve these savings because it will sign the MOU after the prescribed date; thus, YVWD is not required to achieve 3 percent of the savings potential over three years.

[5] The toilet census method is described in the "CII UFLFT Savings Study" published by CUWCC, Second Edition 2001. Data used in this chapter is a draft data base developed by CUWCC during the development of the toilet census method.

Table 4-4
CII ULFT 10-Year Savings Potential
(2004-2013, Acre Feet)

Sector	10-yr. Potential Savings (AF)
Offices	34
Retail/ Wholesale	225
Hotels	12
Health	55
Other	22
Industrial	13
Schools: K to 12	32
Eating	31
Government	7
Churches	5
Coverage Total	436

Source: CUWCC Coverage Calculator, ver. 1.65

As we discuss in later chapters when developing a preferred conservation plan, there are many ways to achieve this conservation potential. For example, a targeted ULFT program that focuses on the high savings replacements will be more cost effective than the average.

4.8 RESIDENTIAL ULFT REPLACEMENT

BMP 14 concerns the replacement of toilets installed before 1992 with ULF toilets in residential areas. The BMP requires that ULFT savings be at least as effective as a replacement-at-resale ordinance. Savings effectiveness is defined in technical detail in Exhibit 6 of the MOU. Exhibit 6 calculations are made in the Coverage Calculator based on input service area characteristics.

Table 4-5 first shows the number of single-family and multi-family units in the service area before the ULFT plumbing code. These figures are based on historical YVWD

data as described above for BMP 2. The annual rate of housing demolition and average rate of toilet replacement due to toilet failure or remodeling are both commonly referred to figures used in Exhibit 6. The percent of pre-1992 houses constructed prior to 1980 and the average persons and toilets per household are based on District staff estimates. Average rate of resale is based on county figures provided in the Coverage Calculator for the County of Los Angeles, which most closely approximates residential patterns in YVWD.[6]

Table 4-5
BMP 14 Data

Data Element	Single Family Units	Multi Family Units
Number Housing Units in Service Area Constructed Before 1/1/1992	6,634	2,299
Estimated annual rate of housing demolition (or conversion)	0.50%	0.50%
Percent of Pre1992 Housing Units Constructed Prior to 1/1/1980	50%	50%
Average Number of Persons Per Household	2.10	2.00
Average Number of Toilets Per Household	2.50	1.20
Average rate of toilet replacement due to toilet failure or remodeling	4.00%	4.00%
Average rate of resale	4.46%	9.02%

Table 4-6 show the number of households with old toilets as of the first year of implementation, 2004 (assuming year 2003 signing of the MOU). In addition, the table provides savings estimates that consider both persons per household. The Coverage Calculator results in a figure of 328 AF for cumulative net savings by 2014. The BMP calls for achieving savings that are within 10 percent of replacement-on-resale calculations.

[6] San Bernardino County figures are 6 and 10 percent respectively. YVWD is in San Bernardino County

Table 4-6
BMP 14 Calculations

Data Element	Single Family Units	Multi Family Units
Estimated Housing Units with 3.5+ gpf Toilets in 2004	4,075	1,412
Estimated Savings per Housing Unit (gallons per day)	21.3	36.7

Source: Housing units based on calculation with demolition rate and rate of toilet replacement from the previous table. Savings based on CUWCC Cost and Savings Document, Section 2.6.5, Primary Method.

YVWD has not implemented its own active ULFT programs that we have identified. Thus, there are no previous programs for which to calculate credit.

4.9 CONCLUSIONS

This section has provided an overview of what the BMPs will ask of YVWD—in terms of the readily quantifiable requirements—should it sign the MOU.

at the border with Los Angeles County.

YUCAIPA VALLEY WATER DISTRICT
URBAN WATER CONSERVATION FEASIBILITY STUDY AND IMPLEMENTATION PLAN

SECTION 5
COST-EFFECTIVENESS

5.1 INTRODUCTION

This chapter provides the costs, savings, and cost-effectiveness of conservation measures considered in this analysis. We first provide a structure to consider the costs of programs from different perspectives of analysis, and to consider the costs of different program configurations and designs. Then we introduce the estimation of conservation savings and provide working figures suitable for this planning study. Finally, we combine the information on costs and savings into a cost-effectiveness supply curve. The supply curve forms the basis for thinking through the strategy of creating a well-coordinated conservation plan.

5.2 PROGRAM DESIGN

Program design influences both the costs and benefits of conservation. For example, a toilet replacement program may be implemented as a rebate program, mass distribution program, or with direct installations. In each of these examples, there would be different costs of implementing the program and the costs would be shared differently among agencies and customers. Likewise for benefits: targeting the programs to replace pre-plumbing-code fixtures will results in greater net savings.

5.2.1 Programs and Devices

An important aspect of program design is the definition of what will be done to conserve water. What conservation devices are being utilized? Which conservation activities are

being performed? By what mechanism are these devices and activities delivered to the end user—by direct installation, rebate, or by household distribution?

In this analysis we use the following convention: Programs refer to any organized activity to deliver conservation devices or activities. Two programs that deliver the same device (e.g., ULF toilet) may have different costs if they have different delivery mechanisms (e.g., direct install v. rebate). In predicting the costs of conservation programs during the planning process, one needs to estimate the number of program instances (households) and the number of devices or activities for each program instance, e.g., one ULF rebate plus a LF showerhead per household participating in the program.

5.2.2 BMPs and Conservation Programs

This chapter is not limited to the conservation BMPs described in Chapter 4. Nor is it limited to the narrow and literal interpretation of the BMPs as described in Chapter 4. Rather, this chapter provides the tools to assess the costs and benefits of other conservation programs or program designs for which one can determine costs and savings per program intervention. We include the following programs in the model, as defined by their conservation devices, activities, and delivery mechanisms:

BMP 1 - Residential Water Surveys

In considering the design of a potential residential survey program for YVWD, there is a variety of choices regarding devices and activities. This analysis starts with the assumption that YVWD will conduct a typical survey including indoor and outdoor water use. For single family residential surveys, we assume on average that there is on average 1/4 acre irrigated area surveyed, 1 faucet aerator installed, .5 toilet flappers replaced, and 4 percent of the time leaks are found (non-toilet leaks). For multi-family surveys, the same conservation devices and activities would be included; however,

outdoor conservation is assumed to include .5 acres and 10 units per site or equivalently .05 acres surveyed per unit—a proportional share of the common landscape.

BMP 2 - Plumbing Retrofit

Since this BMP is interpreted primarily as a retrofitting showerheads, at least for the BMP accounting purposes, this analysis includes only showerheads. One program instance is defined by the installation of one showerhead in both single family and multi-family housing units.[1]

BMP 5 – Large Landscape

This analysis defines each instance of a water budget for large landscape to be a budget associated with a dedicated landscape meter. Each instance of a water budget, then, covers on average the average acreage at a dedicated meter—assumed to be acres per meter (Water Master Plan). For mixed-use meters at commercial, industrial, and institutional sites, we assume 0.25 acres per site to be consistent with land use code which requires one-quarter acres minimum landscape for commercial sites in the area.

BMP 6 – High Efficiency Washing Machines

One program instance is defined, simply, as one washer rebate. Rebates can be in the single family residential, multi-family residential, or commercial sectors.

[1] Again, YVWD may choose to include other devices or activities in this BMP or to combine implementation by using a different delivery mechanism—such as including showerheads in a survey program or along with a toilet replacement program.

BMP 9 and BMP 14 Ultra Low Flush Toilet Replacements

Each program instance is one ULF toilet rebate. For single and multi-family residential replacements (BMP 14), one low flow showerhead will be distributed with each toilet rebate, and we assume that on average ¼ of these will be installed where a non-low-flow showerhead exists.

Remotely Adjusted ET Controllers

YVWD is considering several technologies that would adjust irrigation timers for landscape customers by transmitting a signal to the controller either by broadcast signal or by telephone signal. Each program instance would be one residential household.

5.3 COST OF CONSERVATION PROGRAMS

5.3.1 Perspectives of Analysis

When accounting for costs, this analysis considers the perspective of analysis. For example, for a direct install ULF toilet program, the cost to the water supplier per program intervention might be the cost of the toilet and its installation. For a rebate program, in contrast, the cost is simply the amount of the rebate plus administration. However, the customer pays for the balance of the costs to purchase and install the fixture. For the purpose of this analysis, we consider the perspective of the retailer (YVWD) and the perspective of all agencies, including YVWD, other local or state agencies should there be grants or cost sharing.[2]

Table 5-1 shows typical costs that may be incurred to implement the programs listed. Costs may vary considerably from these depending on the program designed by YVWD. The ULFT programs listed below and the high efficiency washer programs

below are rebate costs. The rebates clearly can be more or less; however, the values in the table are based very roughly on the amount justified by considering the water and wastewater benefits for YVWD described in Chapter 6.

Table 5-1

Program	Cost per Program Instance
BMP1 Survey SF	$100.00
BMP1 Survey MF	$50.00
BMP2 Retrofit SF	$8.00
BMP2 Retrofit MF	$8.00
BMP5 Lg. Land: Ded. Meters	$800.00
BMP5 Lg. Land: Mixed Meters	$100.00
BMP6 HE Washers	$50.00
BMP9 CII ULFT	$120.00
BMP14 Res. ULFT SF	$60.00
BMP14 Res. ULFT MF	$115.00
Broadcast ET Controllers: SF	$300.00
MF HE Washers "BMP 6A"	$100.00
Comm HE Washers "BMP 6B"	$ 150.00

5.4 SAVINGS FROM CONSERVATION DEVICES AND ACTIVITIES

Savings from conservation programs can be projected for YVWD based on existing studies; however, care must be taken when applying estimates that were made under different conditions in other service areas at different times. Estimates of water savings are typically one of three kinds. The most reliable estimates are those made in the field using empirical program evaluation methods—such as a control group and weather normalization. Engineering estimates are commonly used because empirical field estimates are not always available; all conservation devices will have an engineering estimate associated with it.

Common challenges faced when estimating conservation savings include targeting, free riders, and passive conservation. Programs that are designed to effectively target high

[2] Other important perspectives include the customer and the "total society" perspective.

savings potential sites may cost more because additional information is needed, but they also may save more water. In the presence of plumbing code, targeting may be particularly valuable if it can effectively sort out those potential program participants who would install conservation devices without agency action—the so called "free riders." Savings that occurs due to plumbing code or other factors that are not motivated by water supplier programs are commonly referred to as "passive" conservation savings—vs. "active" savings. To get the most "conservation bang from the water supplier buck," efforts are made to target opportunities where passive conservation would not otherwise occur.

5.4.1 Estimates by Device and Activity

Indoor Leak Detection

Although, as mentioned above, the prevalence of leaks (non-toilet leaks) determined by survey is relatively small—approximately 4 percent—each leak fixed in association with a residential survey has been estimated to save 12.4 gallons per day (CUWCC 2000). Savings are assumed to have an average life span of 8.5 years.

Outdoor Residential Water Survey

For each acre of residential landscape, this analysis assumes that outdoor surveys save approximately 5 percent of the water required for medium-water-requirements plant palate (for single and multi-family residential customers). **Table 5-2** shows the range of water needs for different landscaping in the planning phase for YVWD. Savings are assumed to have an average life span of 4 years.

Table 5-2
Water Requirements
(Inches per Acre)

Very Low	31.03
Low	37.16
Medium	46.44
Medium High	52.71
High	61.91

Source: Preliminary Irrigation Report for Oak Valley

Faucet Aerator

Savings from the installation of a faucet aerator are assumed to be 1.5 gallons per day, based on statistical analysis of water savings in another Southern California service area (CUWCC 2000). The assumed life span of savings is 2 years.

Low Flow Showerheads

Savings from the installation of low flow showerheads have been studied in a number of empirical studies (e.g., see those reported in CUWCC 2000). Based on the best of these studies, we assume that savings are 5.5 gallons per day. Although study of the persistence of savings has been limited, we use the common assumption that savings life span is 5 years (CUWCC 2000).

Toilet Flapper Replacement

Each instance of toilet flapper replacement is assumed to result in savings of 8 gallons per day that have a life span of 4 years. The savings figure is based on empirical study (CUWCC 2000).

Large Landscape

An empirical study of water budgets tied to rates and customer outreach reported savings of 19 percent, after controlling for weather and other variables. We assume that savings will be 19 percent of the medium water needs figure for the YVWD service area.[3] Since water budgets would presumably stay in place and since they are likely to be achieved with up-to-date hardware as well as scheduling, we assume that the life span for these savings will be 10 years. In contrast, for water surveys alone, without a water budget, such as those likely at a typical commercial site, the assumption is that savings will be 10 percent and that the savings life span will be 4 years.

High Efficiency Washers

The analysis assumes that savings from high efficiency washers in single family residential settings will be 13.9 gallons per day with a 10 year life span based on the values presented in CUWCC 2000. Savings for multi-family installations are assumed to be twice that of single family (27 .8 gpd). Savings for commercial setting are assumed to three times that of single family (41.8 gpd).

CII Ultra Low Flush Toilets

CUWCC has conducted an empirical study of the savings derived from ULF toilet installations in commercial, industrial, and institutional settings—the so called "CUWCC CII ULFT Study – Second Edition." Exhibit 8 of the MOU is based on these savings assumptions, reproduced in **Table 5-3**. For future planning purposes, we use 44 gallons per day savings, the average of eating establishments and retail, because we

[3] Since water use without landscape conservation programs is likely to be considerably higher than water needs, this is a "conservative" estimate in the sense that it is on the low end of the range of savings estimates.

expect the program will be implemented as a program targeted narrowly at these two sectors in YVWD.

Table 5-3
CII Ultra Low Flush Toilet Savings
(gallons per day)

SIC Code	Savings
Hotels/ Motels	16.0
Eating Est.	47.0
Health	21.0
Offices	20.0
Retail / Wholesale Est.	40.0
Other	18.0
Industrial	23.0
Churches	28.0
Government	25.0
Schools	18.0

Source: CII ULFT Study – Second Edition

Residential Ultra Low Flush Toilets

ULFT savings used in this analysis are calculated using the Primary Method suggested in CUWCC 2000, Section 2.6.5:

SFSavingsGPD = (6.693*PPH)-(0.529*(PPH^2))+7.826
MFSavingsGPD = (19.123*PPH)-(0.942*(PPH^2))+2.181

Where: PPH is persons per household. The resulting savings of 21.3 gpd for SF and 36.7 gpd for MF are assumed to have a 10 year life span.

Remotely Adjusted ET Controllers

The recent "ET Controller Study" conducted for the Municipal Water District of Orange County found that broadcast-adjusted controllers saved 37 gpd in residential settings. Another new technology—featuring two-way communication with controllers—is

expected to achieve at least the same savings although it has not yet been tested in the field. This analysis assumes that the life span for savings is 10 year savings.

5.5 COST-EFFECTIVENESS AND NET PRESENT VALUE

Using the cost and savings assumptions described above, a conservation plan can be assessed in terms of its total costs, cost per acre foot, total benefits, benefits per acre foot, benefit-cost ratio, and net present value.

For example, to use the economic measures as a screening tool, we could take the range of conservation programs described above and make cost-effectiveness calculations for each program. Then the cost per acre foot and net present value can be compared side by side. For example, a simplistic example is calculated that includes 1 instance of each program. We expect total savings to vary considerably because some of the programs concern large water use and savings (3 acres of irrigated landscape per meter) compared to smaller use items (a showerhead). **Table 5-6** includes cost per acre foot calculated from the perspective of the retailer; the wide range of costs per acre foot is a function of the program cost, savings, and life span figures discussed above. Benefits per acre foot of water saved are based on the discussion in Chapter 6 where benefits are calculated in one of three categories: indoor savings, small landscape, and large landscape. The benefits figures in **Table 5-6** reflect one of these three categories, or a combination thereof where appropriate (e.g., residential surveys with indoor and outdoor components.)

and need to be replaced, or are replaced because of remodeling each year—so called "natural replacement" which result in "passive" conservation savings.

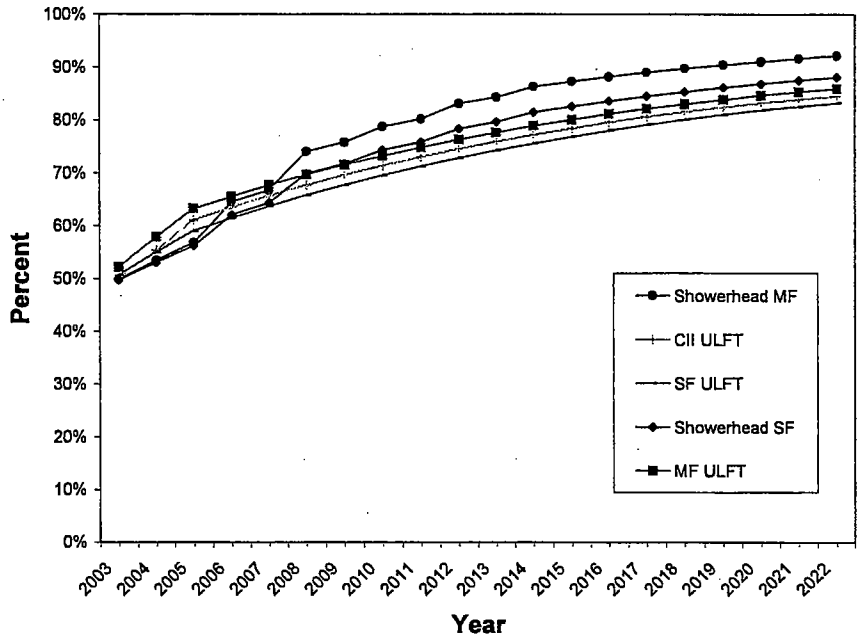
To determine saturation rate in YVWD, we need to estimate the current inventory of relevant devices and sites where conservation activities are likely to yield savings:

Showerheads

The inventory of pre-plumbing-code showerheads is determined by multiplying the number of single family houses by the average number of showerheads per home. Using a survey estimate of the number of showerheads per single family home (2 showerheads) and the number of single family accounts in 1992 (6,287), we can determine that there were 12,574 showerheads in the service. After 12 years of natural replacement at—say—four percent per year, roughly 38 percent of these showerheads are likely to be low flow. Since all new growth since 1992 compliant with plumbing code includes low flow showerheads, the service area wide saturation is even higher. **Figure 5-1**, for example, shows that by 2003 the saturation of showerheads in single family sector is approximately 50 percent.

Figure 5-1 also shows increasing saturation prospectively through the years in the period of analysis. Increases in saturation are driven by: 1) natural replacement, assumed to be 4 percent per year, 2) active conservation programs, as shown in the stair step pattern in **Figure 5-1**, and 3) new construction, which is 100 percent low flow fixtures; thus pulling up the average saturation rate further.

Figure 5-1 Device Saturation



Growth rates in the total inventory are calibrated to match the inventory of single and multi-family housing in 2002, and are selected to roughly match those in the Water Master Plan in future years:

1991–1998	1.0%
1999	5.0%
2000-2002	6.0%
2003-2020	2.7%
2001-	1.0%

Indoor Leak Detection

Since the leak detection we refer to in this activity is the residential sector, the inventory of potential sites for indoor leak detection is the sum of single family and multi-family units, a total of 8,464 in 1991.

Outdoor Survey, Residential

An assumed .25 acres per single family household, on average, yields a 1,572 acre inventory in 1991. For multi-family units, an assumed .06 of an acre per unit is assumed, based on the assumptions of .5 acres per site and 8 units, for a total of 131 acres in 1991.

Sink Aerators

Each single family household is assumed to have 3 sinks and each multi-family unit is assumed to have 2.3 sinks. The total inventory of sinks in 1991 is calculated to be 28,868.

Showerheads

The analysis uses the assumptions of 2 showers per single family account and 1. 3 showers per multi-family unit, on average. Thus, the total inventory of showerheads in 1991 is estimated to be 12,574 and 2,830 respectively for single and multi-family units.

Residential Toilets and Flappers

The analysis uses the assumptions of 2.5 toilets per single family account and 1. 2 toilets per multi-family unit, on average. Thus, the total inventory of toilets 1991 is estimated to be 15,718 and 2,612 respectively for single and multi-family units, and 18,330 flappers.

Commercial, Industrial, and Institutional Toilets. Using the CUWCC database for the zip codes in Yucaipa and Calimesa, there are a total of 2,389 CII toilets in the service area.

Large Landscape

The analysis assumes that there are on average 3 acres—consistent with the Water Master Plan assumptions—associated with each of the 76 dedicated landscape meters in the service area. The dedicated meters will be eligible for a BMP 5 water budget program. The mixed-use commercial meters (176) will be eligible for water surveys; it is assumed that .25 acres are associated with each mixed-use meter per minimum landscape required of land-use code.

Washing Machines

For the single family residential sector, the analysis assumes that 95 percent of households have their own clothes washer. For multi-family units, it is assumed that half the buildings have their own washers, and that when present, there is one washer per 5 units. For commercial washers, it is assumed that a total of one washer is in the service area for each 40 multi-family units. With these assumptions, the inventory of washers in the service area is 5,973, 218, and 54 machines respectively for single family, multi-family, and commercial in 1991.

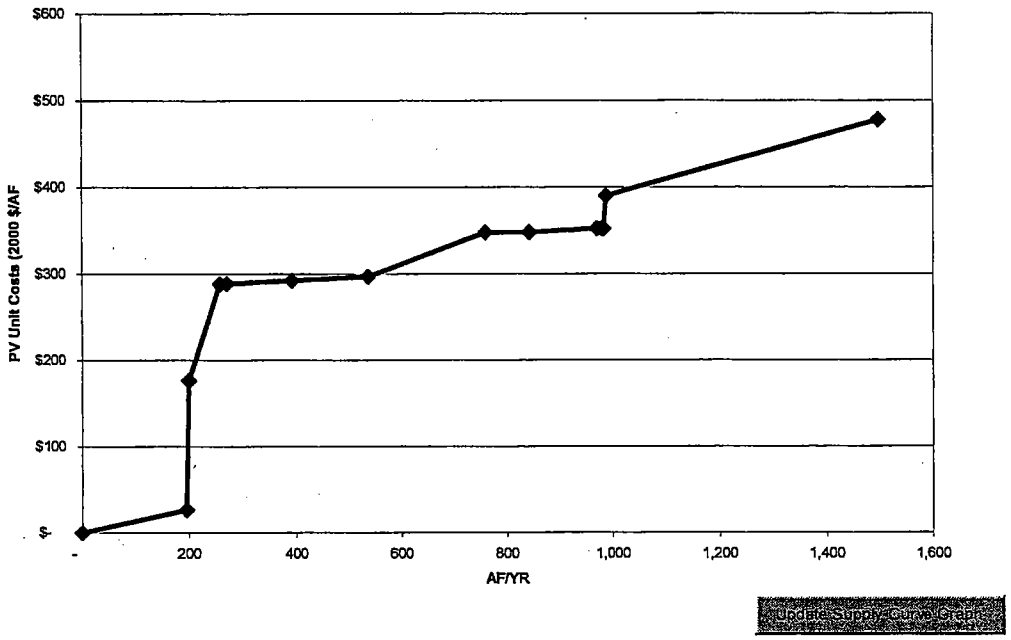
5.7 CONSERVATION SUPPLY CURVE

Combining the information above, this chapter constructs a supply curve for conservation as shown in **Figure 5-2**. The supply curve include the cost per acre foot of each of the conservation programs, sorted from low to high cost. Further, it include the volume of conservation savings potential that could technically be achieved with full market saturation. The vertical axis of the supply curve shows the cost per acre foot and horizontal axis shows the acre feet of conservation potential.

The supply curve can be used as a base for determining which programs to choose. For example, one way to select programs is to select all those below a certain cost per

acre foot cutoff. Alternatively, if a particular water savings goal is to be achieved, one choose the least cost combination of conservation programs to achieve the desired level by starting at the left of the graph and moving to the right..

Figure 5-2 Supply Curve in 2001: Retailer



5.8 CONCLUSIONS

This chapter has documented the methods and assumptions for the calculation of costs and savings of a range of conservation programs. It provides the tools to analyze an assortment of alternative programs and portfolios of programs, as we describe in the next chapter. Through the analysis of programs, we can better assess the appropriate scale and timing of the conservation plan for YVWD.

YUCAIPA VALLEY WATER DISTRICT
URBAN WATER CONSERVATION FEASIBILITY STUDY AND IMPLEMENTATION PLAN

SECTION 6
BENEFITS OF CONSERVATION

6.1 INTRODUCTION

There are three categories of conserved water for which to calculate avoided costs:

- Indoor. Benefits include supply, treatment, distribution, wastewater collection, wastewater treatment, and storage.
- Small landscape (SF residential and commercial). Benefits include supply, treatment, distribution and storage.
- Large landscape. Benefits include supply, distribution, and storage.

This section first describes the individual identified benefits of conservation in YVWD, and then sums the benefits according to the three categories mentioned above.

6.2 WATER SUPPLY BENEFITS

The YVWD Water Master Plan contains detailed descriptions of the existing and future planned water supplies. Although most water currently is from groundwater, it is expected that over the next several years groundwater will be reduced to 40 to 50 percent of the YVWD supply. Groundwater will continue to be the primary source of water in the pressure zones where the wells are located. The other roughly 50 to 60 percent of the service area is located at higher elevations and will receive surface water from the State Water Project (SWP) when available. During dry years, groundwater will be pumped to the higher elevations to make up the deficient.

Thus, the marginal source of supply that conservation can reduce during the planning period of this analysis is mainly surface water from the State Water Project. Completion

of the Regional Water Filtration Facility will allow exchange water from Mill Creek and Santa Ana River to be used. Also, some surface water is available from local surface water supplies, although they are small and relatively less reliable.

YVWD is preparing the infrastructure to deliver State Water Project water from the San Bernardino Valley Municipal Water District and from the San Gorgonio Pass Water Agency. SWP water recently became available during 2003 when the SWP East Branch extension pipeline was completed. The cost of SWP water is expected to be approximately $150 per AF. For purposes of our evaluation it has been assumed that this will increase with inflation by about 3 percent per year in the future.

We assume that one year in 10, on average, SWP water will not be available. In these dry years, the avoided cost of supply is the cost of pumping local groundwater, assumed to be $100 per acre foot on average throughout the service area.

6.3 WATER TREATMENT BENEFITS

The first phase of the new Regional Water Filtration Facility (Regional WFF) is expected to be on line by the summer of 2006. The Regional WFF will treat SWP water and other available surface water supplies. It may be possible to postpone the expansion of this facility by conserving water, reducing the demand for the new facility. The production from this facility has been estimated to grow from 6 mgd to 12 mgd over 10 years, with peak summer usage at 200 percent of the annual average. The need for peak capacity is expected to grow at a rate of 0.6 mgd per year, or equivalently an average capacity of 336 AF per year (= .6 mgd * ½ * 1,120 AF/yr). These figures are expressed in terms of annual averages rather than peak capacity to be consistent to the conservation estimates. In terms of conservation savings, each 336 AF per year of savings allows one-year deferment of the capital cost of expanding the Regional WFF.

The value of deferring the treatment plant one year is the difference between the present value of the cost of construction in 2014 versus the cost to construct in 2015. For simplicity, we assume capital costs are incurred the year before operations and the facility costs of 28.2 million for 12 mgd capacity (Water Master Plan, not including contingency, legal, engineering, and CMS) and O&M for one year is $1.12 million (pg. 10-6). One-year deferral of this investment translates into $564,000 in capital savings and $29,000 in O&M savings at 3 percent interest. Assuming conservation savings of 366 AF per year is sustained over the period of analysis, the benefit of deferring treatment plant capital is estimated at $90/AF.

Groundwater does not require the same extensive treatment for use in the potable system. Thus, treatment benefits related to conservation of groundwater include only the cost of chlorination which are approximately $20 per acre foot.

6.4 WATER STORAGE

The YVWD treated water distribution system is expected to need an additional 26.5 million gallons of storage capacity for combined operational storage and reserve storage (including fire) by the Year 2020 (Water Master Plan). These storage facilities are sized in proportion to expected system demand. Thus, if expected demand is reduced by 5 percent due to conservation, then the storage capacity can be reduced by 5 percent also. The costs of storage capacity are estimated in the Master Plan at $1.25 per gallon if a facility is less than 2 million gallons and $1 per gallon if greater then two million gallons. Assuming YVWD water demand increases by approximately 9,000 afy by 2020 (Master Plan Table 2-1), then each 100 acre foot per year savings reduces storage capacity needs by 1/90, or 0.29 million gallons ($290,000 at $1 per gallon). Over the period of analysis, the benefit is thus $4.16/AF of conservation savings.

6.5 WATER DISTRIBUTION

SWP water will be delivered to YVWD about two thirds of the way up the service territory in terms of elevation. About 30 percent of the total District water demand is in elevations above the site of the new Regional WFF. Water in these elevations will be pumped either 1, 2, or 3 pressure zones above the Regional WFF, with lower volume tapering off rapidly at the higher elevation. At current electricity cost it is estimated that it costs about $60/AF to pump between zones (at 12 cents per Kwh). We assume that on average throughout the distribution system, that one acre foot of water conserved will reduce one acre foot of pumping one zone, or $60/AF.

6.6 WASTEWATER COLLECTION

Conservation is not expected to yield savings in terms of needing smaller capacity pipes or pumps for the wastewater collection system. However, lower volume will result in a lower cost of pumping to the wastewater treatment plant. Although the wastewater treatment plant is at a lower elevation than the water treatment plant, a good deal of the indoor wastewater stream still requires pumping to the wastewater plant. A significant portion of the wastewater needs to be pumped to the WWTP. The approximate savings in the cost of pumping per acre foot of water conserved is $50/AF, which is an assumed 20 percent of the total wastewater generated requiring pumping. Thus, for an average acre foot of indoor savings in YVWD, the wastewater pumping collection savings are expected to be $10/AF.

6.7 WASTEWATER TREATMENT

Wastewater treatment facilities capital costs are not expected to be affected by conservation activities. The wastewater treatment and recycling projects that are planned are needed regardless of the level of conservation effectiveness. Since growth is high and supply is limited in the service area, large-scale use of recycled water is

planned. Furthermore, conservation efforts will only reduce the volume of the water and not the mass of solids to be treated.

Table 6-1 provides details of the O&M treatment costs, including both fixed and variable components. Also calculated in the table are the variable costs that are considered avoidable due to conservation. Annual O&M cost savings are estimated at $194,248 with conservation. For example, it is estimated that 75 percent of chlorination costs can be avoided for a savings of $105,375. At 3.5 mgd, or equivalently, 3,920 afy, the savings per acre foot with conservation sum to $50/af (=$194,248 per yr / 3,920 afy).

Table 6-1

WWTP Budget for FY 2003

	Total Cost	Fixed	Variable	Est Variable Savings from Conservation	Assumed Percent of variable
Labor	$ 482,925		$ 482,925	$ 24,146	5%
Benefits	$ 159,925		$ 159,925	$ 7,996	5%
Repair and Mantenance-Structures	$ 194,000	$ 194,000		$ -	
Automation Control	$ 45,000	$ 45,000		$ -	
Chemicals	$ 244,600		$ 244,600	$ 12,230	5%
Propane	$ 5,000	$ 5,000		$ -	
Utilities-Power	$ 445,000		$ 445,000	$ 44,500	10%
Laboratory Services	$ 101,780		$ 101,780	$ -	0%
Laboratory Supplies	$ 27,000		$ 27,000	$ -	0%
Chlorination/Dechlorination	$ 140,500		$ 140,500	$ 105,375	75%
Sludge Disposal	$ 80,000		$ 80,000	$ -	0%
Plant Support Facilities	$ 19,710	$ 19,710			
General Supplies & Expenses	$ 5,000	$ 5,000			
	$ 1,950,440	$ 268,710	$ 1,681,730	$ 194,248	12%

6.8 WASTEWATER DISPOSAL

Since the mass of wastewater solids will not change due to conservation, there is not anticipated to be any savings in disposal costs.

6.9 RECYCLED WATER CONSERVATION

The case of large landscape conservation is different from the other end uses in YVWD in that there will be considerable use of reclaimed water over the next 20 years. Initially in the period of analysis, there will be approximately 80 percent SWP water used (untreated) for large landscape. By 2020 as the non-potable water distribution system is expanded, there is estimated to be 20 percent SWP and 80 percent recycled water. Since the recycled water needs to be pumped from the wastewater treatment plant to the customer and the new landscape customers are on average 1.5 zones above the plant, the pumping costs are expected to be $90/AF. Thus, savings from conservation of recycled water in large landscape yields benefits of $90/AF.

In addition, untreated SWP is planned for use in the non-potable water system. For these large irrigation customers receiving untreated SWP water the benefits are the cost of the water, which is approximately $150/AF as previously described.

6.10 GROUNDWATER OVERDRAFT

Conserved water in Yucaipa does not benefit solely the YVWD—it benefits all who access basin. The groundwater basin underneath the Yucaipa Valley does not terminate at the boundaries of the YVWD service area. Other groundwater users will directly benefit whenever YVWD reduces their groundwater pumping. The linkage in the cost of pumping groundwater between all users of the groundwater basin means that YVWD will not reap all the benefits from a future investment in water conservation. Surrounding parties who pump from the basin will benefit from YVWD's investments.

6.11 BAY DELTA BENEFITS

Conserved water in Yucaipa benefits more than just YVWD and others who pump from the ground water basin—it benefits all who access Bay Delta water as well. The Bay-

Delta ecosystem is stressed in terms of the balance between supply and demand, water quality of surface and ground water, salt water intrusion, and habitat management. Conservation provides a range of benefits that are important. First, water demand is reduced, reducing pressure on Bay Delta supply. Reduced demand load on the Bay-Delta system also increase operational flexibility, making water quality targets easier to meet.

The benefits of Yucaipa water conservation that accrue to other users and to the Bay-Delta ecosystem provide a strong rationale for outside co-funding of conservation programs in the Yucaipa Valley.

6.12 STORM WATER RUNOFF

Outdoor landscape conservation can also reduce surface runoff which can transport contaminants into sewer systems, streams and into watersheds that extend beyond the Yucaipa Valley. Coastal communities downstream in the watershed have identified the negative effects of storm water runoff and are spending money to divert and treat storm water runoff. Since Yucaipa does not currently spend money to treat storm water, no direct avoided costs have been quantified in this study. This study assumption can be revisited and revised in the future as conditions warrant.

6.13 OTHER BENEFITS

There are other incidental benefits within the Yucaipa valley, of course. Streets, fences and other hard-scape elements are damaged by excess watering and plant health is not optimal without well managed irrigation.

6.14 QUANTIFIED BENEFITS OF CONSERVATION: ADDING IT UP

For each of the three categories of conservation savings, the quantified benefits can be added up by summing the benefits previously described, and summarized as follows:

Table 6-2
YVWD Avoided Costs from Conservation ($/AF)

Indoor Avoided Costs	Small Landscape Avoided Costs	Large Turf Avoided Supply
$352	$292	$138

Notes: Benefits from conservation starting in 2003.

For indoor conservation savings, the benefits include:

- Avoided water supply;
- Avoided water treatment;
- Avoided water distribution;
- Avoided wastewater collection;
- Avoided wastewater treatment; and
- Avoided storage costs.

For small landscape conservation savings, the benefits include:

- Avoided water supply;
- Avoided water treatment;
- Avoided water distribution; and
- Avoided storage costs.

For large landscape conservation savings, the benefits include:

- Avoided water supply for the share that is SWP water (not recycled water);
- Avoided water distribution (pumping recycled water up from the WWTP; and
- Avoided storage costs.

Table 6-2 summarizes quantified benefits. The difference between "Indoor" and "Small Landscape" avoided costs is that small landscape does not include wastewater benefits. "Large Turf" avoided costs includes only untreated SWP water (for the share in the non-potable system that is not recycled), water distribution, and storage benefits.

6.15 CONCLUSIONS

Water conservation programs assist YVWD in accomplishing its mission of providing safe potable drinking water and wastewater treatment services. This section has identified several benefits of conserved water--direct service costs that can be avoided—such as water source costs, treatment costs, delivery costs, and wastewater treatment costs. These potential benefits can provide a strong dollar and sense case for the funding of some level of water efficiency programs in the Yucaipa Valley. However, not all of the benefits of conservation accrue only to the YVWD. Some of the benefits accrue to others who pump from the local ground water basin, other SWP suppliers, and other parties interested in the Bay Delta ecosystem or Southern California watersheds. A firm understanding of these potential benefits can lay the financial rationale for outside co-funding of conservation programs that would allow them to be implemented on a much larger scale than could be justified on local benefits alone.

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SECTION 7
CHOOSING A PREFERRED CONSERVATION PLAN

7.1 INTRODUCTION

The purpose of this chapter is to use the cost effectiveness tools developed in Chapter 6 to construct alternative portfolios of conservation programs for YVWD to consider for implementation.

Several of the most apparent ways to construct a portfolio of conservation program are as follows:

1 MOU Compliance. Chapter 5, for example, analyzed the BMPs in the MOU. One approach to selecting a conservation portfolio is to take a narrow, literal interpretation of the BMPs. Alternatively, since the MOU has considerable flexibility built into it, one could try to improve upon the narrow interpretation while making efforts to fulfill the general objectives of the BMPs.

2 Cost Minimization. This approach involves selecting a quantity of water savings to achieve and using the cost effectiveness tools to select the least-cost assortment of conservation programs that achieves the designated savings objective.

3 Savings Maximization. This approach involves selecting a budget objective and finding the conservation programs that yields the maximum conservation savings for that budget.

4 Maximize Net Present Value. Find the program or programs that maximize net present value. In other terms, if benefits outweigh the costs, then do it.

5 Implementation or Policy Strategy. Although the economic criteria are a sensible approach, economic models may not readily tell the whole story. For example, YVWD may want to employ more creative ideas such as:

   a. Risk Avoidance. Select only a small number of the most attractive conservation programs to implement first—a phased implementation to reduce risk of a poor investment.

   b. Customer Assistance. The District could elect to assist a subpopulation within its service area—for example, to assist the elderly on fixed incomes, target conservation programs at the older trailer parks.

c. Largest Savings Potential at Few Sites. Focus on large landscape because it has big potential savings, and work in other areas of conservation at a later time.
d. Proven Technologies. Invest only in proven technologies, such as ULF toilets, to maximize the chance of successfully achieving savings.
e. New Technologies. Invest in new technologies that have great promise to spur the market or test their efficacy.

In the following sections of this chapter, three conservation portfolios are presented to demonstrate the alternative approaches, and to identify a preliminary recommendation for implementation by the District.

7.2 MOU COMPLIANCE

The first alternative conservation plan constructed is a program based on the readily quantifiable BMPs in the MOU as they apply to YVWD. The plan takes the results of the analysis in Chapter 4 and applies the cost effectiveness tools from Chapter 5 and 6. Again, since the MOU has more flexibility than revealed by a narrow reading of its Exhibit 1 there are likely to be creative ways to construct a BMP compliant program. This is a constructive starting point program comprised of the following elements:

- **BMP 1** scheduled survey for single family and multi family residential sector.
- **BMP 2** showerhead distribution adequate to reach the 75 percent target over two reporting periods.
- **BMP 5** water budgets at 90 percent of dedicated meters and scheduled surveys for mixed-use meters.
- **BMP 9** ULF toilet installations that are consistent with the preliminary goals as if the preliminary goals, but on schedule consistent with YVWD signing the MOU in 2003.[1]
- **BMP 14** implemented in a way to achieve the end conservation goals by implementing a three year program for residential ULF toilets that targets 75 percent single family and 25 percent multi family.[2]

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[1] Strictly speaking YVWD is not yet required to do the ULFT portion of BMP 9 because of it is signing the MOU later.

[2] Cost savings could be achieved by matching the BMP's savings goals each reporting period over time; the three year implementation is a simplification of the BMP requirement.

These elements are summarized in **Table 7-1** which shows the number of program instances planned for each program.

Table 7-1

Gross Number of Interventions by Program for Each Year

Program Intervention	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BMP1 Survey SF	-	-	-	130	-	182	-	234	-	286	-	177	-
BMP1 Survey MF	-	-	-	45	-	63	-	81	-	99	-	61	-
BMP2 Retrofit SF	-	-	-	663	-	663	-	-	-	-	-	-	-
BMP2 Retrofit MF	-	-	-	230	-	230	-	-	-	-	-	-	-
BMP5 Lg. Land: Ded. Meters	-	-	-	-	-	-	68	-	-	-	-	-	-
BMP5 Lg. Land: Mixed Meters	-	-	-	-	3	-	3	-	5	-	6	-	7
BMP9 CII ULFT	56	110	166	-	-	-	-	-	-	-	-	-	-
BMP14 Res. ULFT SF	373	373	373	-	-	-	-	-	-	-	-	-	-
BMP14 Res. ULFT MF	124	124	124	-	-	-	-	-	-	-	-	-	-

Table 7-2 shows the savings and cost-effectiveness of these conservation measures. The column labeled Total Savings is the total savings over the life of the program. The "PV Costs" and "PV Benefits" columns are the total discounted costs and benefit values respectively. "B/C" is the benefit-cost ratio, and "NPV" is the net present value, which is equal to the present value of benefits minus the present value of costs. NPV is the most reliable economic measure because it indicates not only benefits relative to costs (e.g., B/C), but also the magnitude of how much total benefits exceeds total costs. **Table 7-2** shows the preferred plan outlined above would achieve 2,537 AF savings over the period of analysis at a cost of $300,708. Benefits exceed cost by $215,943 (NPV).

Table 7-2

MOU Compliance

Program	Total Savings (AF)	PV Costs ($/AF)	PV Benefits ($/AF)	B/C	NPV
BMP1 Survey SF	274	$ 81,329	$ 88,214	1.08	$ 6,885
BMP1 Survey MF	36	$ 14,066	$ 11,629	0.83	$ (2,437)
BMP2 Retrofit SF	33	$ 9,429	$ 11,506	1.22	$ 2,077
BMP2 Retrofit MF	11	$ 3,271	$ 3,992	1.22	$ 721
BMP5 Lg. Land: Ded. Meters	1,713	$ 45,559	$ 236,673	5.19	$ 191,114
BMP5 Lg. Land: Mixed Meters	11	$ 1,850	$ 3,101	1.68	$ 1,251
BMP9 CII ULFT	131	$ 38,318	$ 46,103	1.20	$ 7,785
BMP14 Res. ULFT SF	203	$ 65,244	$ 71,495	1.10	$ 6,251
BMP14 Res. ULFT MF	125	$ 41,642	$ 43,939	1.06	$ 2,297
	2,537	$ 300,708	$ 516,651		$ 215,943

7.3 LEAST COST

If we choose a savings objective and find the least cost method of achieving that objective, we can read the result directly off the supply curve. **Table 7-3** summarizes the supply curve in table format. The result is to use the lowest cost per acre foot conservation program to its fullest potential, then move on to the next lowest cost program, etc. For example, a savings objective of 2,537 AF (total savings over the period of analysis saved in the MOU alternative) could be achieved selecting the least cost BMP and exhausting its conservation potential, then moving on the next least cost BMP, etc. This can be determined from **Table 7-3** by starting with the least cost conservation measure in the table, BMP 5 Large Landscape Dedicated Meters, which has an annual potential savings of 196 AF. With a lifespan of 10 years, this measure has the potential to yield 1,960 total AF over the period of analysis. **Table 7-3** then shows the next least expensive measure, BMP 5 Large Landscape Mixed Meters, which has the potential to add 5 AF over a 4 year savings life for a total of 20 AF. The least-cost strategy continues this process of selection until the desired conservation goal is achieved.

Table 7-3

Supply Curve

Name	AF Supply	Cum. AF Supply	PV Unit Costs $/AF
BMP5 Lg. Land: Ded. Meters	196	196	$ 27
BMP5 Lg. Land: Mixed Meters	5	201	$ 177
BMP2 Retrofit SF	58	259	$ 288
BMP2 Retrofit MF	13	272	$ 288
BMP9 CII ULFT	121	393	$ 293
BMP1 Survey SF	146	539	$ 297
BMP14 Res. ULFT SF	221	760	$ 348
BMP14 Res. ULFT MF	84	843	$ 348
BMP6 HE Washers	127	970	$ 352
MF HE Washers "BMP 6A"	9	980	$ 352
Comm HE Washers "BMP 6B"	3	983	$ 352
BMP1 Survey MF	5	988	$ 390
Broadcast ET Controllers: SF	509	1,497	$ 478

Table 7-4 shows the combination of conservation measures that achieves the conservation goal at least cost. The least cost approach achieves 2,540 AF of total savings for a total cost of $250,400 to the retailer. **Table 7-4** shows the number of program interventions. The BMP compliance approach achieves 2,536 AF at a cost of $300,566 to the retailer.

Table 7-4

Example Least Cost Program Alternative

Program	Instances
BMP 5 Large Landscape – Dedicated Meters	76
BMP 5 Large Landscape – Mixed-Use Meters	176
BMP 2 Plumbing Retrofit – Single Family	9,000
BMP 2 Plumbing Retrofit – Multi-Family	2,000
BMP 9 CII ULFT	700

7.4 A PREFERRED PLAN

One way to construct a preferred plan is to start with the BMPs that are cost effective, and then shape their implementation into a three year program to condense administration effort and to achieve earlier reductions. **Table 7-6** outlines the number of instances of each program to implement in such a program. The BMP 2 Retrofit program is roughly the same number of instances required of the BMP, but they are condensed into the three even amounts in three earlier years. For BMP 5 Large Landscape, all of the dedicated meters are included (not just the 90 percent that the BMP requires) and they are implemented in three earlier years. For mixed use meters, the number of instances is the same as the BMP requires, but again condensed and early. The ULFT programs are all as per the BMP analysis.

Table 7-6

Preferred Plan Program Activity

Program	2003 Instances	2004 Instances	2005 Instances
BMP2 Retrofit SF	400	400	400
BMP2 Retrofit MF	150	150	150
BMP5 Lg. Land: Ded. Meters	25	25	25
BMP5 Lg. Land: Mixed Meters	8	8	8
BMP9 CII ULFT	56	110	166
BMP14 Res. ULFT SF	373	373	373
BMP14 Res. ULFT MF	124	124	124

Table 7-7 shows the preferred plan outlined above would achieve 2,400 AF savings over the period of analysis at a cost of $218,623. Benefits exceed cost by $221,369 (NPV).

Table 7-7

Preferred Plan

Program	Total Savings (AF)	PV Costs ($)	PV Benefits ($)	B/C	NPV
BMP2 Retrofit SF	30	$ 9,323	$ 10,413	1.12	$ 1,090
BMP2 Retrofit MF	11	$ 3,496	$ 3,905	1.12	$ 409
BMP5 Lg. Land: Ded. Meters	1,889	$ 58,269	$ 261,036	4.48	$ 202,767
BMP5 Lg. Land: Mixed Meters	11	$ 2,331	$ 3,101	1.33	$ 771
BMP9 CII ULFT	131	$ 38,318	$ 46,103	1.20	$ 7,785
BMP14 Res. ULFT SF	203	$ 65,244	$ 71,495	1.10	$ 6,251
BMP14 Res. ULFT MF	125	$ 41,642	$ 43,939	1.06	$ 2,297
	2,400	$ 218,623	$ 439,992		$ 221,369

7.5 COST SHARING

This chapter has referred to costs to this point simply as the costs incurred by the water supplier—YVWD—should it go forward with the conservation plans. However, to the extent there are possibilities for cost sharing with other local, state, and federal water suppliers and/or governments, or other utilities such as energy or gas, the preferred program should reflect potential funding opportunities. Programs could be expanded or

they could be designed to be more effective or attractive (e.g., bigger rebates, better targeting).

Since the benefits of conservation are "shared" often to a good extent, there may be considerable interest on the part of others to participate in co-funding arrangements. For example, benefits to the groundwater basin benefit the two other suppliers who pump from the basin as well as YVWD. Since YVWD will soon be delivered State Project water, conservation savings will help reduce the load on one of the state's largest water transportation systems as far north as the Bay Area ecosystem and tributaries. Benefits that accrue broadly provide some rationale for seeking broader sharing of conservation funding.

7.6 CONCLUSIONS

This section demonstrates how different outcomes result from different approaches to selecting a portfolio of conservation investments.

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SECTION 8
RECOMMENDATIONS

8.1 INTRODUCTION

Based on the analysis in this report and in the Water Master Plan, this section provides recommendations for YVWD to pursue.

8.2 DEVELOP CONSERVATION PLAN WITH PUBLIC PROCESS

The conservation plan described in the previous chapter can be considered a starting point for a public process. Through the public process, the plan can be improved and public support can be gained for its implementation.

We recommend that the public process include public notices and meetings. A draft conservation plan—the Preferred Program Alternative—should be available for review and summarized at a public workshop. Public comments should be received and integrated into the plan as appropriate.

8.3 SIGNING THE MOU

Signing the MOU signals YVWD's intent and efforts to fulfill the BMPs as they are developed by the California Urban Water Conservation Council. Although this involves commitments on the part of the agency, we recommend YVWD sign the MOU because we believe the advantages and benefits warrant these commitments.

The MOU and its conservation measures are becoming increasingly more firm requirements with accountability—though not regulatory requirements at this time.

Thus, signing and participating now will prepare YVWD for further conservation accountability should this trend continue in processes such as CALFED. Further, as a signatory to the MOU, YVWD will be able to more actively participate in these policy developments.

Funding sources are more frequently requiring either MOU signature or equivalent effective conservation activities. In this way, signing the MOU may help cost sharing arrangements that are developing for the large capital investments YVWD is making in treatment, recycling, and distribution.

It is important to note that the BMP commitments are tempered by at least two elements of its language. Some of the BMPs call for conservation "at least as effective as" some specific activity level. This leaves agencies such as YVWD room to implement programs in flexible more cost-effective manner. Further, there are provisions of the MOU that allow as water supplier to gain exemption from a BMP if is shown that the BMP is not cost-effective in their service areas from the supplier perspective with cost sharing or from the total society perspective.

8.4 COLLABORATE WITH OTHER AGENCIES

8.4.1 Groundwater Basin

Of immediate concern is the groundwater overdraft of the local groundwater basin. Effective management into the future will require cooperation among the three agencies that pump from the basin: South Mesa Mutual Water Company and Western Heights Mutual Water Company as well as YVWD. For example, coordinated joint plans to manage demand for groundwater basin water may be more effective and more attractive possibilities for outside funding. Without cooperation, each agency has unclear incentives to invest in conservation; if one agency invests, but the others increase their demand, the overdraft problem will remain.

8.4.2 Regional Water Suppliers and State Agencies

YVWD will be increasingly connected directly or indirectly to the major water supply challenges facing the entire state and facing Southern California in the years ahead. These connections provide the basis for finding mutual interests and reasons for collaboration.

For example, new growth in the YVWD service area will rely on State Project water. Thus, YVWD has the clear basis for collaborating with agencies working on regional and State-wide supply issues; for example, we recommend that YVWD systematically track California Department of Water Resources funding opportunities that are aimed at reducing the demands on the Bay Delta. Further collaboration with the San Bernardino Municipal Water District on State Project and groundwater issues may also provide opportunities.

Although YVWD does not rely on Colorado River water, a good part of Southern California relies on this source in combination with State Project water. As California is required to comply with the its Colorado River allocation, whether this year or 15 years from now, the demand patterns may change for State Project water. In, turn, the reliability and assurance that water will be available during drought times is affected for all suppliers relying on the State Water Project. Thus, cooperation with local wholesales and neighboring retailers is needed to ensure reliability of supply.

8.5 CONCLUSIONS

Pursuing conservation in the Yucaipa Valley provides a number of advantages for the service area community. Because cost-effective conservation can be determined by examining alternative programs, it is financially sensible to plan for conservation in the context of capital spending plans for supply, treatment, wastewater treatment, and

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SECTION 9
IMPLEMENTATION PLAN

9.1 INTRODUCTION

This chapter provides an implementation plan for the conservation activities described in the recommendation section. Included in the discussion of implementation are three components:

- Estimated Conservation Savings. In this section we described the estimated conservation savings year-by-year that result from the planned program.
- Five-Year Budget. A budget for each of five years of implementation is suggested to describe the resource needs for the program.
- First-Year Program Budget. A task list of the activities that need to take place over the first year is also described. A more detailed budget is provided for the first year that tracks each of the described tasks.

Since the preferred alternative may be refined in the process of discussion with the public and during the Board approval process, this implementation plan may be revised.

9.2 ESTIMATED CONSERVATION SAVINGS

Figure 9-1 shows the conservation savings estimated to result from the recommended conservation plan implementation. Since there is uncertainty in the longevity of savings as well as the magnitude, the savings estimates described in Section 5 are assumed to have specific time horizons. For example, ultra low flush toilet savings are assumed to last 10 years. Since plumbing code requires ULF toilets, savings will continue beyond 10 years; we use the 10 year figure simply to indicate that investment by YVWD now accelerates the replacement of old toilets. **Figure 9-1** is plotted with an extended time

horizon so that savings limits are clearly displayed. Section 5 described the continued passive conservation savings derived from plumbing code.

Thus, the savings in **Figure 9-1** are those estimated to result from implementing the measures described in the conservation plan. The savings are solely the additional savings that would be achieved above and beyond what would be achieved without YVWD action.

Figure 9-1

Added Future Active Savings by Program

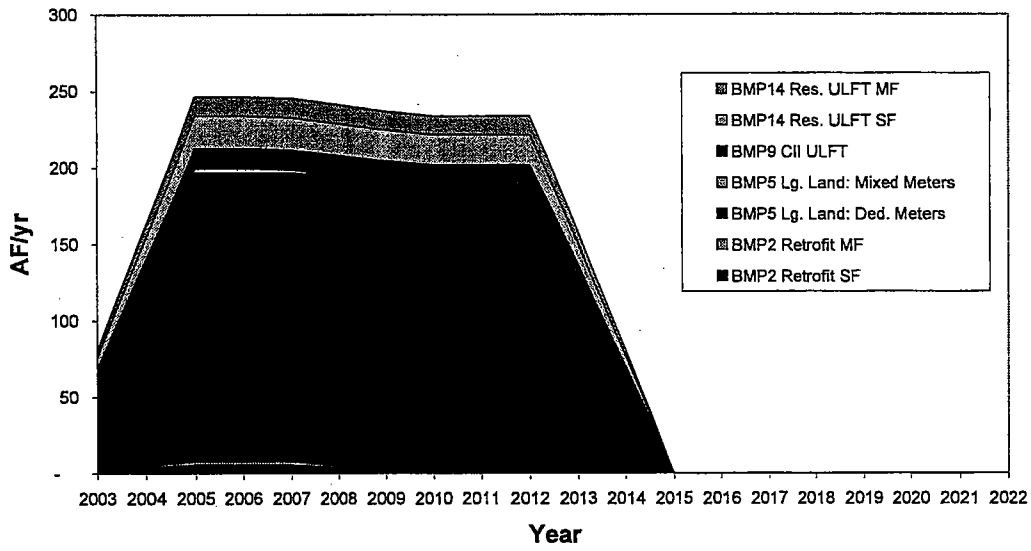

Table 9-1 shows the savings in greater detail. Note, for example, that savings from the large landscape program for dedicated meters are expected to last over a number of years. Savings depend on the effectiveness of implementation. Large landscape water conservation is a combination of irrigation hardware and landscaper practices. Implementation that keeps conservation practices going on an ongoing basis is needed for persistent savings.

Table 9-1

Implementation Plan Savings Over Ten Years (AF/yr)

Program Intervention	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
BMP2 Retrofit SF	2.0	3.9	5.9	5.9	5.9	3.9	2.0	-	-	-
BMP2 Retrofit MF	0.7	1.5	2.2	2.2	2.2	1.5	0.7	-	-	-
BMP5 Lg. Land: Ded. Meters	63.0	126.0	188.9	188.9	188.9	188.9	188.9	188.9	188.9	188.9
BMP5 Lg. Land: Mixed Meters	0.9	1.8	2.7	2.7	1.8	0.9	-	-	-	-
BMP9 CII ULFT	2.2	6.5	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1
BMP14 Res. ULFT SF	7.0	14.0	21.0	21.0	21.0	20.5	20.1	19.6	19.6	19.6
BMP14 Res. ULFT MF	4.2	8.5	12.7	12.7	12.7	12.6	12.4	12.3	12.3	12.3
Total	80.0	162.2	246.6	246.6	245.7	241.5	237.2	233.9	233.9	233.9

The savings ramp up over the first three years because the implementation plan calls for three years of program investment. For example, BMP 2 showerhead retrofit savings build over the first three years, then remain constant for two years before declining. The savings life is assumed to be five years, causing the decline. Note that the slight decline in residential ULF toilet savings—even though the savings life is assumed to be 10 years—is because it is assumed that a showerhead (with an assumed 5 year savings life) is distributed with each ULF toilet.

9.3 FIVE YEAR BUDGET PROJECTION

The five-year budget for implementing the conservation programs recommended in this report consists of up to a year of planning and public process, three years of program activity, and then one year of evaluation and planning next steps.

Table 9-2 and **Table 9-3** show two elements of a five-year budget. **Table 9-2** shows the cash budget for conservation program activity if, as assumed, it is outsourced on a contract basis. **Table 9-3** shows the program level activity in terms of staff person full time equivalents. Clearly other approaches exist over a five year period—including compressing or expanding the implementation schedule.

Table 9-2

Implementation Plan Five-Year Contract Budget

Program Intervention	FY 02-03	FY 03-04	FY 03-04	FY 03-04	FY 03-04
BMP2 Retrofit SF	$ -	$ 3,200	$ 3,200	$ 3,200	$ -
BMP2 Retrofit MF	$ -	$ 1,200	$ 1,200	$ 1,200	$ -
BMP5 Lg. Land: Ded. Meters	$ -	$ 20,000	$ 20,000	$ 20,000	$ -
BMP5 Lg. Land: Mixed Meters	$ -	$ 800	$ 800	$ 800	$ -
BMP9 CII ULFT	$ -	$ 6,692	$ 13,201	$ 19,954	$ -
BMP14 Res. ULFT SF	$ -	$ 22,394	$ 22,394	$ 22,394	$ -
BMP14 Res. ULFT MF	$ -	$ 14,293	$ 14,293	$ 14,293	$ -
Total	$ -	$ 68,579	$ 75,088	$ 81,841	$ -

Table 9-3

Implementation Plan Five-Year Staff Budget (FTE)

Program Intervention	FY 02-03	FY 03-04	FY 03-04	FY 03-04	FY 03-04
Management	0.10	0.10	0.10	0.10	0.10
Program Administration	0.10	0.25	0.25	0.25	0.10
Support	0.10	0.25	0.25	0.25	0.10
Total	0.30	0.60	0.60	0.60	0.30

9.4 FIRST YEAR PROGRAM BUDGET

9.4.1 Task 1: Public Workshops

The next step in the program development is to present the draft conservation feasibility study and plan in this report in public workshops. The motivation for conservation and its benefits will be explained effectively to members of the public. Input on the program feasibility, acceptability, cost and savings will be elicited and discussed at the workshops. With input from the workshops, the conservation plan will be revised.

9.4.2 Task 2: Outsource Contracting

Given the one-time costs of the plan, we assume that at least some—if not most—of the conservation activities will be carried out be outsourced through independent contractors. An RFP needs to be issued and contracting arrangements made. The

RFP will be distributed to potential contractors identified by asking agencies who have done this in the past and those referred by CUWCC.

9.4.3 Task 3: Administration and Tracking

The first period of implementation will involve final budgeting, scheduling, and preparation of public relations materials. Over the course of the active programs, YVWD will administer the contracts and track progress.

9.4.4 Task 4: Verification and Evaluation

Periodic evaluation of the program will provide the opportunity to make mid-course corrections and improve efficiency or effectiveness. The District may consider verification of conservation devices and activities.

Table 9-4

First Year Program Budget

Task	Labor FTE	Expenses	Notes
Task 1 Public Workshops	0.10	$ 1,000	Notification, duplication costs
Task 2 Outsource Contracting	0.20	$ 500	Notification, interviews, contracting
Task 3 Administration and Tracking	0.20	$ 500	Contractor coordination and tracking
Task 4 Verification and Evaluation	-	$ -	(starts next year)
Total	0.50	$ 2,000	

9.5 CONCLUSIONS

Implementation of the conservation plan involves a mix of public relations and contracting. To avoid pitfalls, the plan can benefit from the experience in other service areas and from the input provided in public workshops.

Attachment B. Beaumont Basin Adjudication